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NEW ENGLAND SURGICAL SOCIETY

A COMPARATIVE MORTALITY STUDY OF ACUTE APPENDICITIS*

BY IRVING J. WALKER, M.D.†

IN 1914, Dr. J. M. T. Finney stated that "the last word in appendicitis has not been spoken, nor will it be spoken until we have 100% recoveries". Judging from numerous articles in recent medical literature pertaining to the rising mortality in appendicitis, we are still far from the millennium suggested by the above writer.

Our interest and sole problem in this study of appendicitis was to determine, if possible, whether the mortality was really rising. We had been inclined to believe with others that the policy of operating freely for appendicitis had resulted in a great saving of life from this disease, an assumption which we now believe to be only partially correct. We reasoned somewhat as follows as regards the question of whether the mortality was rising:

Against the belief that it was rising, we considered that the laity should be more familiar than ever with the symptoms of the disease, and hence should seek medical advice earlier than previously; that the physician should be better prepared to make an early diagnosis; and that the operator should be better qualified to handle the situation from the surgical aspect. Therefore, theoretically, there were factors which should indicate a lower death rate.

On the other hand, if the mortality was rising, could it be possible that the disease had changed in some form, resulting in a higher death rate? We had no evidence, clinical or pathological, to support this theory, other than the statement of Davis, who says that "since the influenza epidemic in 1918 and 1919 there has been a greater number of cases of appendicitis which are due to a type of organism which tends to produce a progressive peritonitis". This statement must be deemed an impression since no statistics are quoted to prove the truth. If it is so, we have a definite factor contributing to an increased mortality rate.

Were those suffering from appendicitis being operated upon by surgeons less qualified than those of fifteen or twenty years ago? We felt confident that the trained surgeon of today is better than ever qualified to meet surgical situations. We were likewise inclined to believe with Wilkie, Archer, and Jones that during the past twenty years there has been an increasing number of those with an insufficient and therefore dangerous knowledge of surgery to whom some portion of a rising mortality could justifiably be charged. Again, it appeared probable that during recent years a greater percentage of positive diagnoses had been made, and that the increase in the percentage of deaths based on population might have followed proportionately the increased incidence of operation. Furthermore, we could not dismiss the idea that varying interpretations of terminology in the classifications of vital statistics during the different eras might account for the apparent rise in mortality.

Such were some of the queries which we could not answer without considerable investigation. We therefore decided that a study of the literature, combined with the experience of hospitals, including our own, would add some information toward the solution of the question of whether the death rate was rising.

Attention seems to have been focussed upon the subject of the rising mortality in appendicitis about the year 1925, apparently initiated by the papers of Adams and Sherren, following the stimulus of an address by Mr. James Berry before the Royal Society of Medicine, in 1922. In the United States, no less than twenty-five papers pertaining to the subject have been published during the past eight years.

STUDY OF VITAL STATISTICS

We discovered quite early that mortality rates would vary according to whether the determination was based on deaths from the disease per 100,000 population, or upon case fatality, that is, the number of deaths among those suffering from the disease.

It has been estimated that during recent years there have been approximately 25,000 to 30,000 deaths annually from appendicitis in the United States, as compared with 16,000 to 18,000 twenty years ago. The study of vital statistics proves beyond a doubt that the mortality per

*From the Harvard Surgical Teaching Service, Boston City Hospital.

Read at the Annual Meeting of the New England Surgical Society, Hartford, Conn., September 30, 1932.

†Walker—Surgeon-in-Chief, Harvard Surgical Teaching Service, Boston City Hospital. For record and address of author see "This Week's Issue," page 160.

100,000 population has been gradually rising, as shown in the following plate:

PLATE 1

DEATH RATE PER 100,000 POPULATION

In Appendicitis and in Peritonitis without specified cause

	United States Bureau of Census (Registration Areas)		Commonwealth of Massachusetts	
	Appendicitis	Peritonitis	Appendicitis	Peritonitis
1907-1910	11.2	5.8	8.7	11.7
1911-1914	11.9	3.2	10.	4.5
1915-1918	12.5	2.1	10.2	2.6
1919-1922	13.4	1.9	12.	1.1
1923-1926	15.	1.7	13.2	.7
1927-1930	15.1*	1.†	13.9	.9

*Excluding 1930.
†Excluding 1929 and 1930.

From the above it will be noted that the number of deaths due to peritonitis without specified cause fell appreciably since 1910. In that year greater care was instituted in reporting deaths from peritonitis, to specify as far as possible the causes of peritonitis. While we believe that a certain percentage of deaths before and since 1910 may have been due to peritonitis secondary to appendicitis, we are not inclined to attribute the apparent increase in appendix deaths solely to statistical changes.

Adams, quoting the Registrar-General's returns, shows the mortality in England to have risen from 69 to 74 per million population between the years 1913 and 1923. In this country, statistics from the Metropolitan Life Insurance Company give the mortality for appendicitis between the years 1911 and 1914 as 10.6, and between the years 1927 and 1930 as 14.1. Willis, quoting figures from the United States Bureau of the Census, states that the mortality in appendicitis in 1922 was 31 per cent higher than in the years 1901 to 1905. He also says that in the same periods the mortality in ulcer of the stomach and duodenum has risen 72 per cent, that of gall-stones 77 per cent, and that of goitre 250 per cent. Let it be remembered that these figures are based on the deaths per 100,000 population and not upon the number of deaths among those individuals suffering from the diseases above mentioned.

Without any burden upon imagination, one can easily explain the above figures of Willis by the increase in deaths following the increase in surgical treatment of these diseases. Granting that it is possible that the percentage of operations for appendicitis has increased 20 per cent to 30 per cent, is it not logical to expect that the mortality per 100,000 could increase in a like proportion?

INCIDENCE OF APPENDICITIS

Adams says that "mortality is not a fair criterion of incidence in the study of any disease." He adds further, as do other writers, a fact to which we attest, that there are no accurate statistics regarding the incidence of appendicitis to compare with the relatively accurate figures of the deaths from this disease per 100,000 population.

Rendle Short and others intimate that there may well be an increased incidence of appendicitis. One is tempted to believe from clinical and postmortem reports that from 1890 to 1910 there was an increased incidence of appendicitis. If such is true, it is possible that this incidence may still be rising.

At the Boston City Hospital there has been an increase of 277 per cent in the number of operations for acute appendicitis for the four year period 1927 to 1930 as compared with the period from 1907 to 1910 inclusive.

At the Massachusetts General Hospital, there was an increase of 23 per cent in the second period as compared with the first.

The difference in increase between the two hospitals can be explained by the fact that the Boston City Hospital, an institution caring for residents of Boston, receives by far the largest number of cases of this disease of any hospital in Boston, while the Massachusetts General Hospital, drawing its patronage from New England as a whole, receives only a small percentage of the cases of appendicitis occurring within this area, the greatest number being treated in the numerous local hospitals throughout New England and not referred to the Massachusetts General Hospital as are other diseases less acute but more serious in nature.

We conclude that more individuals have been operated upon for appendicitis during the past fifteen years than in any similar previous period. Note, however, that we say "operated upon for appendicitis" rather than that there were more cases of appendicitis. While we believe the latter to be true, we surmise that many of the cases of chronic and acute unruptured appendicitis operated upon during recent years would some years ago have been undiagnosed, wrongly diagnosed, or treated medically, and that a considerable proportion of these would have recovered without operation.

Contributing to this increased incidence of operation is the fact that surgery of the appendix, both chronic and acute, has of late become an operation less seriously taken as a major procedure, inviting, as it were, a greater number of operations aimed at appendectomy. In other words, we think that the incidence of appendicitis is possibly still increasing and feel sure that the number of appendectomies based upon the population per 100,000 has decidedly increased, and with this there has been a rise in the mortality rate based upon the same method

of estimation. From the surgical standpoint, we should prefer to estimate the mortality in appendicitis upon deaths following proved diagnoses made from histories, physical examinations, operative and pathological findings, rather than from the study of vital statistics.

OPERATIVE MORTALITY IN ACUTE APPENDICITIS

Believing that if the operative mortality had risen it would demonstrate itself in acute appendicitis, we have undertaken a review of the literature for two periods, as a means of comparison. Incidentally, the mortality rate in chronic appendicitis appears to be between .5 per cent and 1 per cent at the present time.

A possible source of error regarding the operative mortality rate of hospitals is the fact that the statistics reported are usually from larger hospitals, while for various reasons those of the numerous small institutions are not available.

PLATE 2

COMPILED STATISTICS SHOWING OPERATIVE MORTALITY IN ACUTE APPENDICITIS

Year reported	Years studied	Number of cases	Mortality %	Author	Remarks
			Early Period		
1915	1903-1915	736	9.1	Grey Turner, G.	Personal cases
1917	1907-1917	14,154	8.7	Beckman, et al.	Collected from literature
1924	1906-1909	1,159	5.6	Deaver, J. B.	
	Total	16,049	7.8		
			Late Period		
1923	1920-1923	1,677	5.8	Love, R. J. McNeill	From London Hospital
1924	1915-1919	1,159	4.2	Deaver, J. B.	
1925	1919-1923	901	8.4	Adams, J. E.	St. Thomas Hospital
1925	Not stated	600	2.1	Wallace, H. K.	
1926	Not stated	133	1.5	Archer, A., and Young, M.	
1926	Not stated	5,736	4.3	Warnshuis, F. C.	33 Hospitals
1928	1914-1926	1,588	4.9	Weeden, W. M.	Cornell Division N. Y. Hospital
1926	Not stated	1,352	1.1	Guerry, LeGrand	Personal
1927	Not stated	247	13.7	Ashhurst, A. P. C.	Personal—All required draining
1928	Not stated	675	5.3	Eliason and Ferguson	
1928	1921-1926	435	7.5	Hoge, A. F.	
1928	1919-1927	1,000	2.7	Quain, E. P.	
1930	1928-1929	5,121	5.9	Bower, J. O.	27 Philadelphia Hospitals
1930	1924-1927	2,415	9.9	Miller, C. Jeff	Charity and Touro Hospitals
1931	1930	3,095	4.8	Bower, J. O.	28 Philadelphia Hospitals
1931	Not stated	141	7.1	Miller, E. L.	3 years Kansas City Hospital
1931	1926-1930	1,574	4.5	McDonald, A. L.	
1931	Not stated	361	6.4	Tasche and Spano	
1932	1928-1931	528	1.5	Dixon, C. F.	
1932	1927-1931	4,270	4.4	Boland, F. K.	
	Total	33,008	5.3		

For comparison we have as nearly as possible attempted to divide the literature studied into two periods, 1900 to 1915, and that following 1915 to date. Naturally in this tabulation there has been some overlapping of years, studied and reported. The small number of references in the first period is accounted for since the paper of Beckman, Smith and Everingham included the statistical literature for most of this period.

In comparison, it is apparent that the mortality in the second period is about 2.5 per cent less than in the first period.

Haggard, in 1915, stated that "hospital reports for the past year show that the average mortality in appendicitis by all operators in all stages of the disease in those reported hospitals is about 20 per cent."

Writing in the same year, Irwin says that "the mortality still varies from 5 per cent to 25 per cent."

G. Grey Turner, in 1915, stated "I am satisfied as a result of the experience of the last fifteen years that the over-all mortality should not reach more than 5 per cent."

Apropos of the latter statement and the above tabulation, what surgeon of today would be at all satisfied with a case fatality for all types of appendicitis, chronic and acute, which would not be considerably lower than 5 per cent?

The literature therefore indicates that the mortality based upon operation is now lower than twenty years ago.

The following will demonstrate our experience in acute appendicitis at the Boston City Hospital for two periods twenty years apart, 1907 to 1910 inclusive, and 1927 to 1930 inclusive. Cases were chosen for study which were either pathologically acute, or which, in the absence of a pathological report, presented histories and operative findings consistent with

acute pathology of the appendix. Cases of subacute appendicitis and peri-appendicitis were not included for obvious reasons. Our mortality for simple appendectomy in other than acute appendicitis was 1.2 per cent for the years 1927 to 1930, as compared with 2.9 per cent for the years 1907 to 1910.

We would call your attention to the fact that the mortality by years in both groups has been gradually falling, and that the rate for the second period studied is 5.8 per cent as compared with 13.1 per cent in the first period.

Further facts as regards our study of acute appendicitis are shown in the following plates:

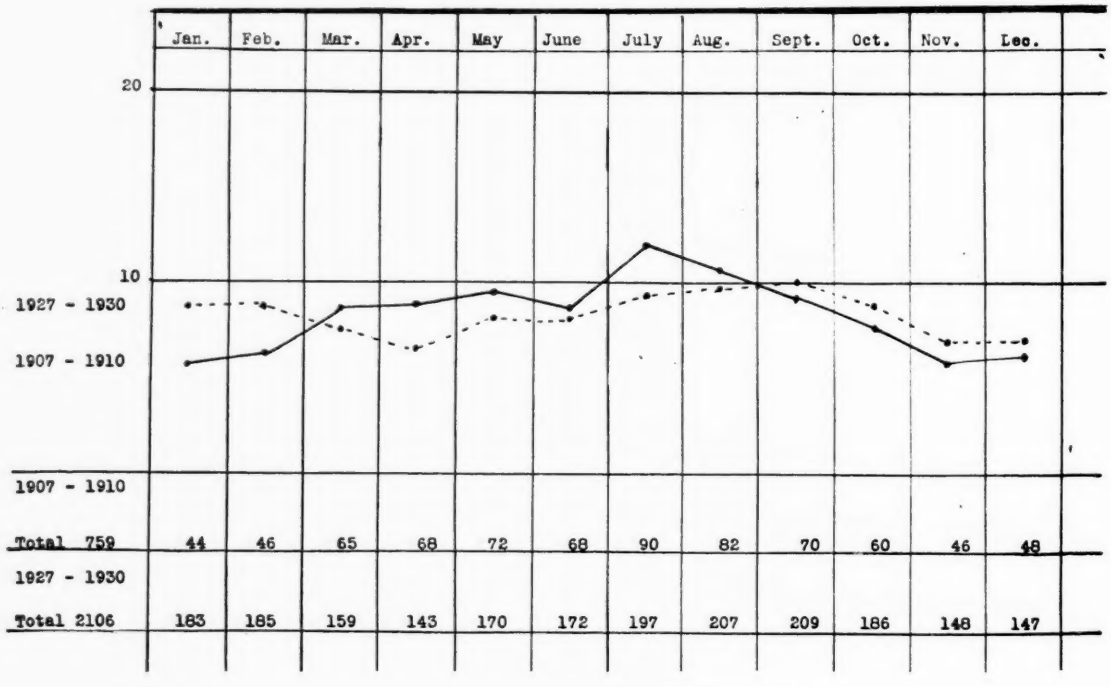
PLATE 3

MORTALITY BY YEARS

	Total	Recovered	Died	Mortality
1907	157	132	25	15.9%
1908	192	162	30	15.6%
1909	180	159	21	11.6%
1910	230	206	24	10.4%
1907-1910	759	659	100	13.1%
1927	526	491	35	6.6%
1928	493	460	33	6.6%
1929	492	466	26	5.2%
1930	595	566	29	4.8%
1927-1930	2,106	1,983	123	5.8%
Both groups 1907-1910 1927-1930	2,865	2,642	223	7.7%

PLATE 4

CURVE SHOWING INCIDENCE BY MONTH

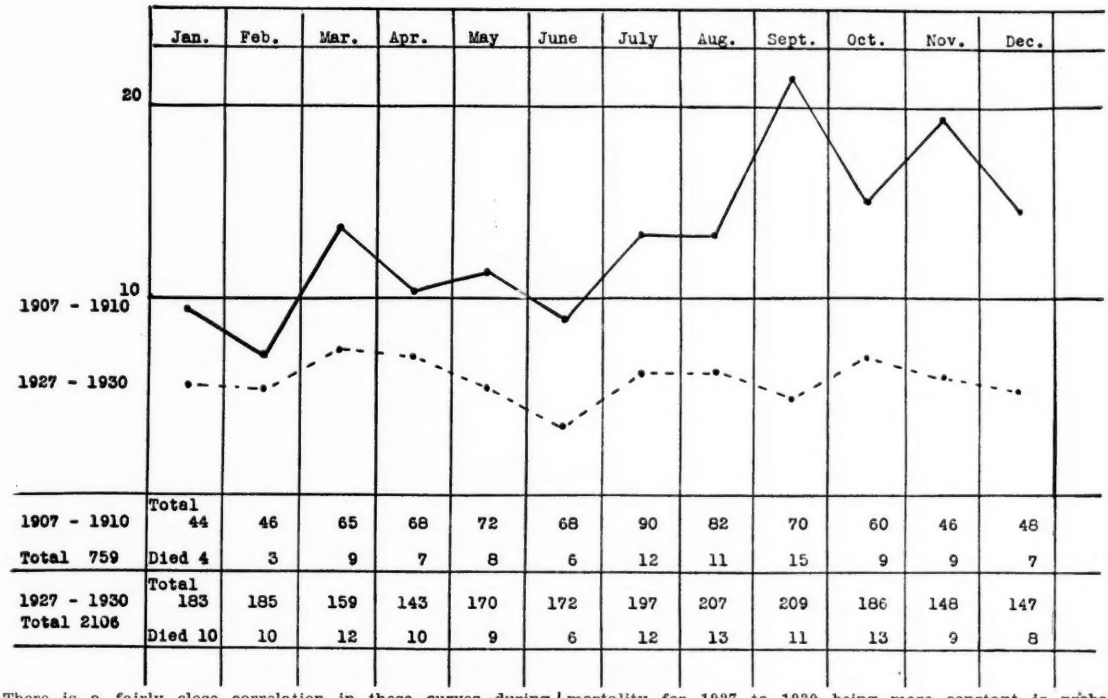


	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1907 - 1910 Total 759	44	46	65	68	72	68	90	82	70	60	46	48
1927 - 1930 Total 2106	183	185	159	143	170	172	197	207	209	186	148	147

There is a rather close correlation in the curves which show a slightly greater number of cases of acute appendicitis during the months of July and August than in other months of the year.

PLATE 5

CURVE SHOWING MORTALITY BY MONTH

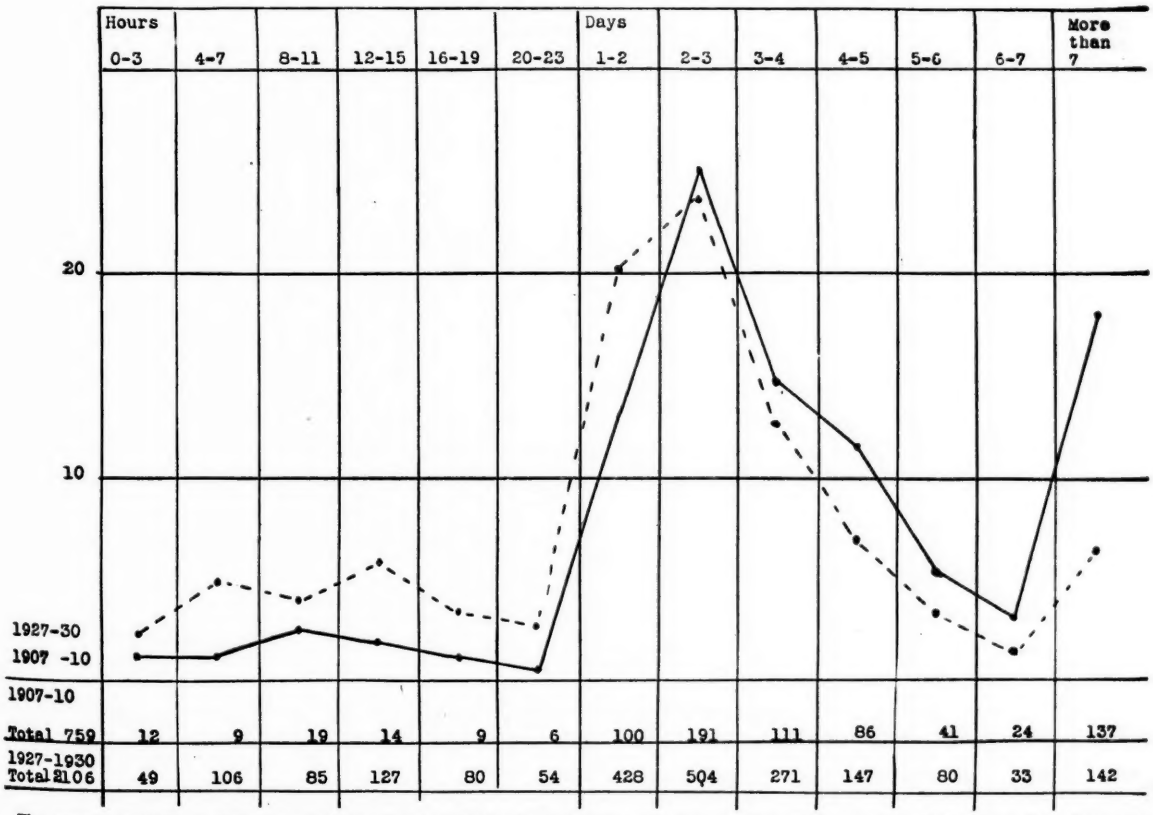


1907 - 1910	Total 44	46	65	68	72	68	90	82	70	60	46	48
Total 759	Died 4	3	9	7	8	6	12	11	15	9	9	7
1927 - 1930	Total 183	185	159	143	170	172	197	207	209	186	148	147
Total 2106	Died 10	10	12	10	9	6	12	13	11	13	9	8

There is a fairly close correlation in these curves during the first eight months of the year. The curve showing the mortality for 1927 to 1930 being more constant is probably a more accurate representation of the mortality by months.

PLATE 6

CURVES SHOWING DURATION

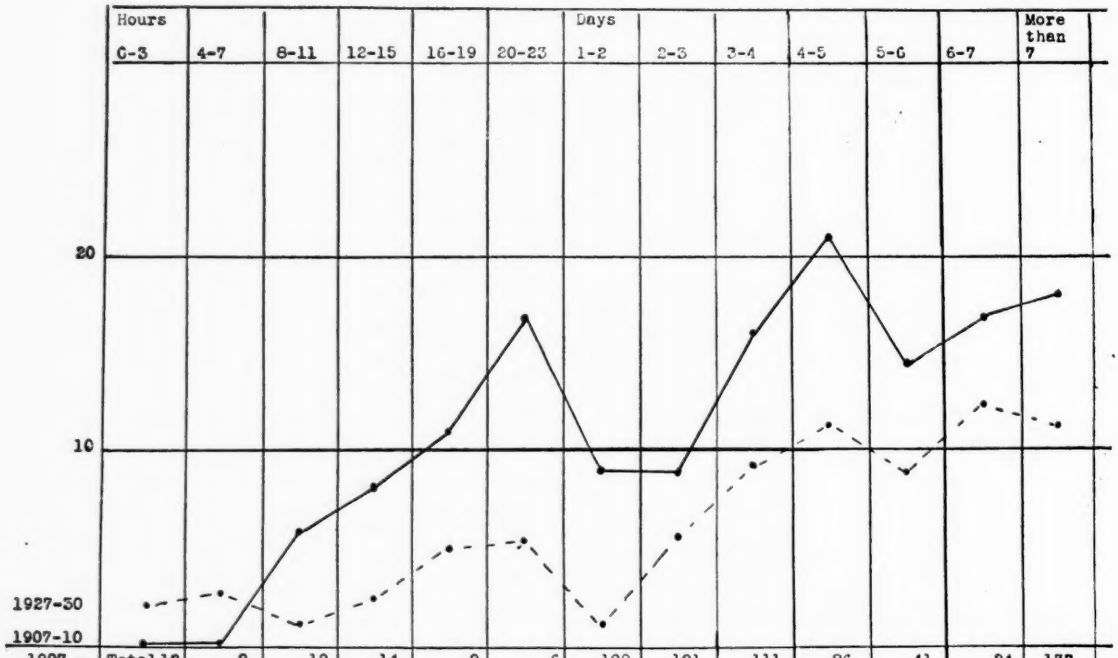


1907-10													
Total 759	12	9	19	14	9	6	100	191	111	86	41	24	137
1927-1930 Total 2106	49	106	85	127	80	54	428	504	271	147	80	33	142

The curves in both periods are similar, showing that at the Boston City Hospital we receive most of our cases between the first and third day after the onset of symptoms. Furthermore, we learn from these curves that there has been no improvement toward earlier entrance to the hospital in the second period.

PLATE 7

CURVES SHOWING MORTALITY ACCORDING TO DURATION

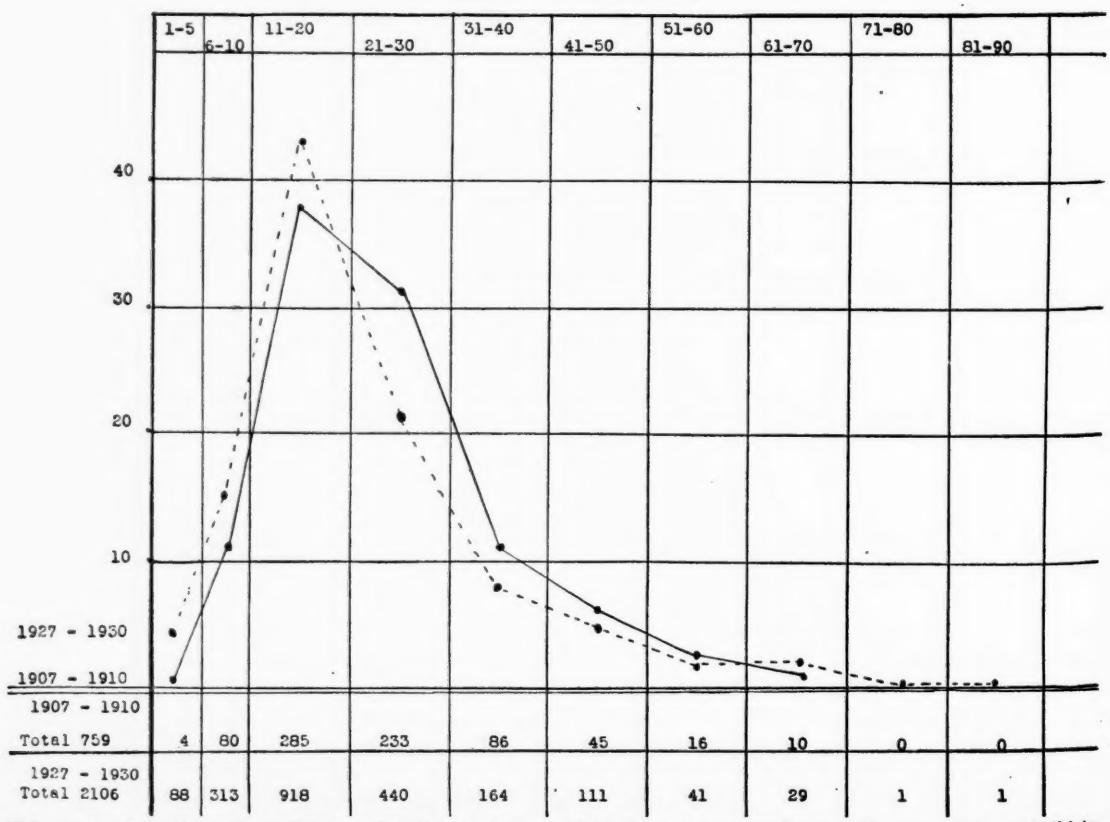


		Hours 0-3	4-7	8-11	12-15	16-19	20-23	Days 1-2	2-3	3-4	4-5	5-6	6-7	More than 7
1907 - 1910	Total	12	9	19	14	9	6	100	191	111	86	41	24	137
	Died	0	0	1	1	1	1	9	17	18	18	6	4	24
1927 - 1930	Total	49	106	85	127	80	54	428	504	271	147	80	33	142
	Died	1	3	1	3	4	3	9	28	25	17	9	4	16

These curves show the danger zones for surgery, namely, between 20 and 24 hours, and fourth to fifth days. Perhaps the dictum "too late for early surgery, too early for late surgery" could be applied to the high case fatality occurring between the twentieth and twenty-fourth hours.

PLATE 8

INCIDENCE ACCORDING TO AGE

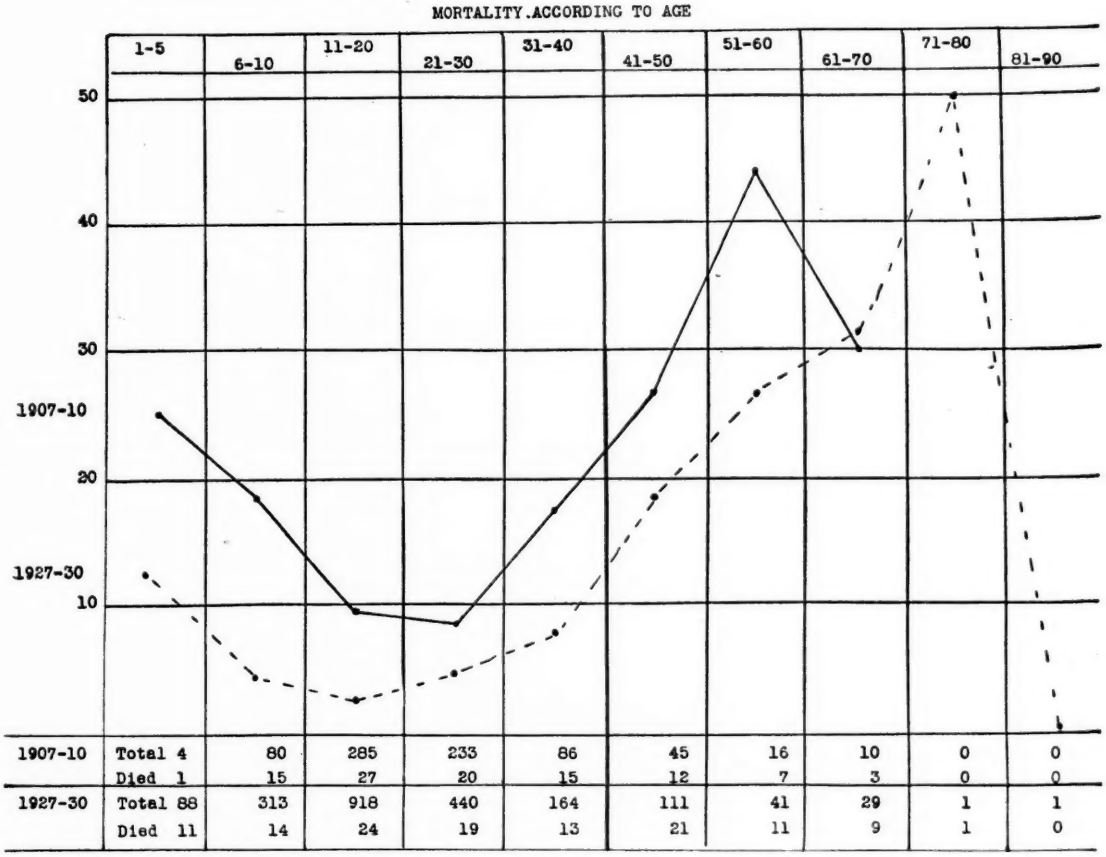


	1-5	6-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
1907 - 1910 Total 759	4	80	285	233	86	45	16	10	0	0
1927 - 1930 Total 2106	88	313	918	440	164	111	41	29	1	1

This curve substantiates the well-known fact that acute appendicitis is most common between the ages of ten and thirty.

PLATE 9

MORTALITY ACCORDING TO AGE



		1-5	6-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
1907-10	Total 4	80	285	233	86	45	16	10	0	0	
	Died 1	15	27	20	15	12	7	3	0	0	
1927-30	Total 88	313	918	440	164	111	41	29	1	1	
	Died 11	14	24	19	13	21	11	9	1	0	

The ages 11 to 30 show the lowest mortality, which, fortunately, are the same ages in which the disease is the most common. It will be seen that the mortality has been lowered in all age groups.

PLATE 10

Incidence According to Sex

	Total	Males	Females	Percentage of males	Percentage of females
1907-1910	759	478	281	63. %	37. %
1927-1930	2,106	1,281	825	60.8%	39.2%

Mortality According to Sex

	Males			Females		
	Total	Died	Mortality	Total	Died	Mortality
1907-1910	478	60	12.5%	281	40	14.2%
1927-1930	1,281	92	7.2%	825	31	3.7%

There is a close association in the two periods as to the incidence according to sex.

Comparison of the two periods in the mortality according to sex shows a marked drop in the second period among females as compared with males. For this difference we have no explanation.

PLATE 11

Mortality According to Types of Appendicitis

	1907-1910			1927-1930		
	Total	Died	Mortality %	Total	Died	Mortality %
Acute unruptured	264	7	2.6	1,174	18	1.5
Acute unruptured with fluid (not peritonitis)	41	5	12.2	265	4	1.5
Appendix abscess	289	37	12.8	328	32	9.7
Acute with spreading peritonitis	124	27	21.8	204	24	11.8
Acute with general peritonitis	41	24	58.5	135	45	33.3

It will be seen that the mortality for all types of acute appendicitis is considerably less in the second period than in the first. The percentage of pus cases in the first period was 40.2, and in the second period 31.7.

PLATE 12

MORTALITY IN CASES WITH PUS ACCORDING TO OPERATIVE PROCEDURE

Appendectomy			Drainage without appendectomy			Appendectomy and enterostomy			Drainage and enterostomy			Appendectomy and multiple incisions			No operation		
Total	Died	Mort.	Total	Died	Mort.	Total	Died	Mort.	Total	Died	Mort.	Total	Died	Mort.	Total	Died	Mort.
Appendix Abscess																	
1907-1910																	
		%			%			%			%			%			%
237	26	11.	47	10	21.3	0	0	0	1	0	0	4	1	25.	0	0	0
1927-1930																	
300	31	10.3	20	0	0	4	0	0	3	0	0	1	1	100.	0	0	0
Acute with Spreading Peritonitis																	
1907-1910																	
104	15	14.4	9	4	44.4	1	1	100.	2	0	0	8	7	87.5	0	0	0
1927-1930																	
188	21	11.2	4	0	0	9	2	22.2	1	1	100.	2	0	0	0	0	0
Acute with General Peritonitis																	
1907-1910																	
26	12	46.1	5	5	100.	1	1	100.	3	2	66.7	6	4	66.7	0	0	0
1927-1930																	
108	31	28.7	9	5	55.5	10	3	30.	3	3	100.	4	2	50.	1	1	100.

Interesting features shown in the above plate are as follows: (1) In the second period there are 20 cases of appendix abscess which were simply drained, without a death. (2) General peritonitis still shows a high mortality regardless of the procedures. It is possible that the teaching of Ochsner applied to present-day surgery might result in a reduction of the case fatality in this type of case. We have recently undertaken on the Harvard Surgical Teaching Service at the Boston City Hospital the treatment of a series of cases of general peritonitis, following the suggestions of Ochsner.

PLATE 13

PERCENTAGE OF OPERATING DONE BY DIFFERENT GRADES OF OPERATORS

	Total	Visiting Surgeon		Resident Surgeon		Interne		No Operation
1907	157	129	82.2%	0	0	28	17.8%	
1908	192	168	87.5%	0	0	24	12.5%	
1909	180	159	88.3%	1	.5%	20	11.1%	
1910	230	190	82.6%	0	0	40	17.3%	
1907-1910	759	646	85.1%	1	.1%	112	14.7%	
1927	526	173	32.9%	47	8.9%	306	58.2%	
1928	493	159	32.2%	119	24.1%	215	43.6%	
1929	492	128	26. %	89	18.1%	275	55.9%	
1930	594	120	20.2%	125	21. %	349	58.7%	1
1927-1930	2,105	580	27.5%	380	18. %	1,145	54.4%	

It will be observed from the above that the Visiting Surgeon is operating on a much smaller percentage of cases than he did 20 years ago, and that the Interne and Resident Surgeon are now doing the greater part of this work.

PLATE 14

MORTALITY FOR GRADES OF OPERATORS

Year	Visiting Surgeon			Resident Surgeon			Interne			No Operation
	Total	Died	Mort.	Total	Died	Mort.	Total	Died	Mort.	
1907	129	24	18.6%	0	0	0 %	28	1	3.6%	
1908	168	28	16.7%	0	0	0 %	24	2	8.3%	
1909	159	20	12.6%	1	0	0 %	20	1	5. %	
1910	190	23	12.1%	0	0	0 %	40	1	2.5%	
1907-1910	646	95	14.7%	1	0	0 %	112	5	4.5%	
1927	173	17	9.8%	47	8	17. %	306	10	3.3%	
1928	159	16	10.1%	119	8	6.7%	215	9	4.2%	
1929	128	11	8.6%	89	5	5.6%	275	10	3.6%	
1930	120	12	10. %	125	12	9.6%	349	4	1.1%	1
1927-1930	580	56	9.6%	380	33	8.7%	1,145	33	2.9%	

In spite of the increased number of appendectomies by the Interne, his mortality is lower than at any time: 2.9 per cent for the 1927 to 1930 period, as compared with 4.5 per cent for the 1907 to 1910 period. During the year 1930, in which the greatest number of appendectomies were done and most of those by internes, the mortality of the latter was 1.1 per cent.

PLATE 15

PREOPERATIVE COMPLICATIONS IN FATAL CASES

	1907-1910 100 deaths		1927-1930 123 deaths	
Bronchitis	3		4	
Pneumonia	2		2	
Tuberculosis	1		2	
Heart disease	3		7	
Arteriosclerosis	2		3	
Diabetes	0		2	
Dermoid cyst	0		1	
Chronic nephritis	1		2	
Carcinoma of esophagus	0		1	
Bronchial asthma	0		1	
Acute tonsillitis	0		1	
Peritonitis (all degrees)	88	88%	101	82.1%
None	10	10%	17	13.8%

Peritonitis is by far the most frequent preoperative complication. Included under peritonitis are the infections associated with appendix abscess, spreading peritonitis, and general peritonitis. We realize the difficulty of differentiating spreading and general peritonitis in certain cases.

Among the fatal cases, only 10 per cent in the first period and 13.8 per cent in the second period had no preoperative complications.

PLATE 16

POSTOPERATIVE COMPLICATIONS IN FATAL CASES

	1907-1910 100 deaths		1927-1930 123 deaths	
Hemorrhage	3		2	
Pneumonia	13		20	
Intestinal obstruction	9		23	
Local abscess in region of cecum	2		4	
Pelvic abscess	4		4	
Subdiaphragmatic abscess	2		3	
Liver abscess including pylephlebitis	2		2	
Septicemia	1		2	
Pulmonary embolism	1		5	
Empyema	1		1	
Fecal fistula	3		2	
Gangrene of cecum	0		1	
Pulmonary edema	0		1	
Parotitis	0		1	
Uremia	0		1	
Toxic psychosis	0		2	
Peritonitis (all degrees)	32	32%	26	21.1%
None	43	43%	38	30.9%

The instances of peritonitis as a postoperative complication include clean cases developing peritoneal infection, appendix abscesses becoming spreading or general peritonitis, and those of spreading peritonitis becoming generalized. Intestinal obstruction was a complication in 9 per cent of the fatal cases in the first period, and of 18.7 per cent of the fatal cases in the second period. It is likely that the diagnosis was more accurately made during the later period.

PLATE 17

ORGANISMS FROM POSITIVE CULTURES IN FATAL CASES

	1907-1910		1927-1930	
Total positive cultures	86		96	
Colon	34	39.5%	48	50. %
Streptococcus hemolyticus	10	11.6%	32	33.3%
Staphylococcus aureus	0	0	0	0
Mixed infections	36	41.9%	8	8.3%
Organisms other than noted above	6	7. %	8	8.3%

One is impressed by the increase in pure cultures of hemolytic streptococcus in the years 1927 to 1930 as compared with the number present in the period 1907 to 1910. The figures are not large, so that a study might be extended to a greater number of cases before drawing conclusions.

PLATE 19

CAUSES OF DEATH

	1907-1910 Total deaths 100		1927-1930 Total deaths 123	
General peritonitis	76	76%	75	61. %
Lobar pneumonia	4	4%	9	7.3%
Broncho pneumonia	2	2%	5	4.1%
Pulmonary embolism	2	2%	5	4.1%
Septicemia, not associated with general peritonitis	3	3%	4	3.2%
Cardiac failure	1	1%	5	4.1%
Intestinal obstruction	7	7%	15	12.2%
Postoperative hemorrhage	1	1%	0	0. %
Pylephlebitis with liver abscess	2	2%	2	1.6%
Toxemia	1	1%	0	0. %
Metastatic carcinoma	0	0%	1	.8%
Shock	1	1%	0	0. %
Diabetes	0	0%	1	.8%
Subdiaphragmatic abscess	0	0%	1	.8%

As would be expected, general peritonitis accounts for the greatest percentage of deaths, and intestinal obstruction for the next largest, in both periods.

PLATE 18

MORTALITY ACCORDING TO SECONDARY OPERATIONS

	1907-1910 Total	Died	Mortality %	1927-1930 Total	Died	Mortality %
Drainage of abscess	41	9	21.9%	50	7	14. %
Operation for obstruction	3	2	66.7%	45	20	44.4%
Transfusion	0	0	0. %	4	4	100. %
Resuture of wound	2	0	0. %	4	0	0. %
Operation for empyema	1	1	100. %	1	0	0. %
Ileostomy for paralytic ileus	15	11	73.3%	31	16	51.6%
Closure of fistula	3	3	100. %	1	0	0. %
Exploration	0	0	0. %	1	0	0. %
Total	65	26	40. %	137	47	34.3%

Secondary operations for intestinal obstruction appear to have been more successful in the second period than in the first. However, the number of these cases reported in the first period is perhaps not sufficient from which to draw a conclusion. Ileostomy for paralytic ileus appears to have been successful in about half of the cases in the second period, as contrasted with a success of slightly more than 24 per cent in the first period. One might speculate as to what proportion of these cases of paralytic ileus would have recovered without ileostomy. Our personal experience with ileostomy for dynamic ileus has not been so encouraging as the above figures would indicate.

PLATE 20

FACTORS CONTRIBUTING TO MORTALITY

Delay - D
Faulty Surgical Management - FSM
Preoperative Complication - PR.C
Post Operative Complication - PO.C

	Total Deaths	D		F S M		D plus F S M		PR.C		PO.C		D plus PO.C		PR.C plus FSM		D plus PR.C		PR.C plus PO.C		D plus FSM plus PO.C	
	100		%		%		%		%		%		%		%		%		%		%
1907 - 1910		41	41	28	28	18	18	1	1	9	9	2	2	1	1						
1927 - 1930	Total Deaths 123	62	50.4	10	8.1	10	8.1	1	.8	25	20.3	11	8.9			2	1.6	1	.81	1	.81

The above table is a personal interpretation of the causes of death, following a close study of the records. Observe that in both periods delay constitutes the greatest percentage of the causes of death. One is also impressed by the fact that in the second period there is a marked increase in the number of post-operative complications which lead to fatality. We attribute this to greater accuracy in observation on the part of those treating these patients during the second period.

CONCLUSIONS

As a result of the study of the literature, combined with the experience of the Boston City Hospital, we have concluded that the mortality rate in appendicitis, based upon vital statistics, has been gradually rising, and that the mortality based upon operations for appendicitis has become lower. We, therefore, have a paradoxical situation regarding mortality rates.

It is our belief that a mortality rate based upon vital statistics is not so fair a method of determining the true mortality as is the relationship between the incidence of the disease and the deaths associated with the same. Up to the present time, surgical statistics give us the best method of determining case fatality in appendicitis.

We think, but cannot prove, that the incidence of acute appendicitis is still rising.

We do not wish to avoid the issue that probably more individuals have died as a result of endeavor to cure appendicitis during recent years than previously. However, we are inclined to believe that the apparent low mortality rate based on vital statistics of twenty years ago was not a true index of the number of deaths due to appendicitis, since some of the deaths attributed to peritonitis of unknown origin and other diseases might well have been deaths primarily due to pathology of the appendix.

Assuming, if one wishes, that more individuals are dying following appendectomy at present than ever before, what possibilities have we to eliminate this unfortunate situation?

If appendicitis is increasing as is possibly the case, why is not a share of the solution of the problem one for preventive medicine?

In the interim, there should be no let-up in the education of the public as to the symptoms of acute appendicitis, eminently a surgical disease in which delay and improper medication, especially catharsis, invite mortality. At the same time, the laity could profitably realize that the symptomatology associated with chronic appendicitis is generally due to abnormal anatomy, pathological conditions, or functional disturbances of other organs or systems.

The general practitioner and internist still have much to learn concerning the diagnosis of chronic appendicitis, and as a result of such knowledge will be able to reduce the number of appendix cases for the chronic type now referred to our institutions, thereby reducing the chance of such becoming potentially surgical.

We anticipate that in the future the number of appendectomies not associated with acute inflammation of the appendix will be considerably less than in the recent past.

We agree with Wilkie that "too many men doing surgery look upon appendicitis as a simple thing," and all should remember as Adams reminds us that "the risk of an abdominal operation can never be reduced to that of having one's hair cut."

Those interested in surgery could well take

appendicitis more seriously from the diagnostic and operative standpoints, realizing that laparotomy carries with it a definite surgical mortality, which when applied to appendicitis may account for a considerable percentage of the rising death rate as revealed in the study of vital statistics, but which makes little impression in the percentage of deaths incidental to operations for appendicitis.

We desire to express our gratitude to those students of the classes of 1931 and 1932 of the Harvard Medical School who have been affiliated with the Harvard Surgical Teaching Service at the Boston City Hospital for their work in collecting cases.

We wish also to acknowledge our indebtedness to the Department of Vital Statistics of the Harvard School of Public Health for coöperation in compiling statistics for this study.

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APPENDIX ABSCESS: OPERATION WITHOUT REMOVAL OF THE APPENDIX*

BY DONALD S. ADAMS, M.D.†

MY subject deals with a localized collection of pus resulting from the rupture of an appendix. Localization is maintained either by old fibrous adhesions or more commonly by fresh adhesions consisting of loops of bowel and adherent great omentum.

I want to bring out the following facts: First, the operation in each instance was simple drainage; in no case was the appendix removed because it was not accessible and attempting to locate and remove it would endanger the patient. Secondly, according to Memorial Hospital statistics, this operation obviated, in a large percentage of cases, the need for future surgery.

Our hospital records showed 2500 operations for appendicitis from 1919 through the first six months of 1930. There were 45 localized appendix abscesses in this series, or 1.8%.

Analysis of these 45 cases showed:

Sex: Evenly divided; female 23, male 22.

Age: Average 26 years; oldest, 76, female; youngest, 19 months, female.

Mortality in hospital: 2 or 4.4%.

Analysis of these deaths:

Case 1. Female, aged 56, diabetic. Operation on admission. Diabetic coma not responding to treatment.

Case 2. Male, aged 68. Operation on admission. Poor surgery, in that gauze packs and Carrel tubes with Dakin's Solution irrigations were used. Death from general peritonitis.

*From the Surgical Services of Memorial Hospital, Worcester. Read at the Annual Meeting of the New England Surgical Society, at Hartford, Conn., September 30, 1932.

†Adams—Junior Visiting Surgeon, Memorial Hospital, Worcester. For record and address of author see "This Week's Issue," page 160.

Mortality after discharge: 1 case or 2.2%.

This patient, a woman, aged 36, had been ill three weeks before admission. She showed a low white count. Operated four days after admission. Abscess outer side of cecum. Drains out the fourth day and discharged 37 days later, still draining. Never remained completely healed and was readmitted a year later with abscess again present. Re-drained for 10 days. Discharged draining at end of 30 days. Again failed to heal. Abscess reformed at home and drained spontaneously. There followed a history of two years of sepsis, and death. This case represents inadequate primary drainage and subsequent failure in follow-up.

Incidence of admissions by years: high peak in 1920 and 1922 with 18 cases. The last six years showed a decline in numbers of appendix abscess cases and the general average of total admissions remaining the same, there was evidence either that patients presented themselves for treatment earlier or that the physicians were more prompt in getting hospitalization.

Position of Abscess: In half the cases the operative description failed to help. The others either definitely stated, or from the writeup a fair idea could be obtained. The majority occupied positions on the outer side of the cecum; the remainder were retrocecal. The two mortalities in this series showed abscesses lying low on the outer side of the cecum.

Time elapsing between onset and hospital entry: Average 9 days. Longest time 3 weeks. Shortest 1 day.

Time between admission and operation: Eighteen were operated upon on admission. Longest time 6 days. Average 3 days.

Length of stay in hospital: shortest 17 days; longest 41 days. Average 28 days.

Clinical findings:

Bacteriology: No growth 6; mixed growth 25; Streptococci 1; Bacillus subtilis 1; Colon Bacillus 4; no report 8.

White Count: Average count 18,000. Lowest 7,000 and highest 42,000. It is difficult to arrive at any conclusion, for different people make the count. It was interesting to note, however, that the patient with the lowest count ultimately died after discharge, from general sepsis, with the appendix as the primary factor. There was a tendency for the younger patients to have high counts and the older, low counts.

Method and duration of drainage:

Penrose tubing with gauze was most commonly used. These drains were either removed gradually, entirely at one time and left out, or withdrawn and new ones replaced at intervals. The best results appeared with gradual withdrawal beginning a week or ten days after operation. The drains were removed in three days in one case. Backing up resulted and reëstablishment of drainage was necessary.

Unusual cases:

1. Transposition of viscera and left-sided retrocecal abscess. Diagnosed before operation. Good operative result.
2. Middle-aged woman treated at home; sent to hospital with appendix abscess pointing under the skin over McBurney's point. This patient had been faithfully poulticed for weeks. Uneventful recovery, but had a fecal fistula which drained one year, finally closing spontaneously.

End results: Of the 43 surviving cases in this series, 5 could not be located. The remaining 38 were either examined or their relatives interviewed.

Twenty-nine cases (76%) were found to be well after 2-12 years and having had no further operative procedure. This group included three incisional hernias, not operated upon.

Three cases now well, but requiring second admission for redrainage.

One finally required appendectomy after being drained a second time.

Three died 1-5 years after discharge, from other causes than the abdominal condition.

One died at home from sepsis following drainage.

One patient was operated on for incisional hernia and reports good result.

Conclusions: Memorial Hospital experience suggests the following:

First: Conservative treatment of appendix abscess is dangerous. Pointing at the abdominal wall or spontaneous rupture into bowel cannot be relied upon. This was shown by three cases found in going over our records. These patients were immediately operated upon after entering the hospital. General peritonitis existed from rupture of what had been a well walled-off process.

Secondly: In operating upon an appendix abscess it is not necessary to break up adhesions looking for an appendix that is not readily accessible. Simple drainage offers a low mortality, but few complications, and a good prognosis particularly in regard to future trouble with the appendix.

Discussion

Dr. Harry C. Clifton, Hartford, Conn.: *Mr. President and Members of this Society*—I enjoyed Dr. Walker's paper very much. It is rather difficult to discuss statistics and I think that undoubtedly we cannot refute the statements the doctor has made. However, I feel

that we are particularly interested in the cause of this increased mortality; first of all, lack of education on the part of the public, and, secondly, I think if we could keep castor oil and salts out of the drugstores and department stores and prevent indiscriminate use of them, we might get somewhere.

On the other hand, the organisms that cause appendicitis are not new, the streptococcus and staphylococcus, and colon bacillus. One bug exists outside the peritoneal cavity, the so-called inexperienced surgeon located in a small town hospital.

I rather feel that these cases of acute appendicitis and appendiceal complications are due to lack of experience.

I have nothing to add to the statistics. I know they are correct and I want to congratulate the doctor on his fine paper.

Dr. Walter C. Seelye, Worcester, Mass.: I enjoyed Dr. Walker's paper very much. It stimulated me to look up some statistics from our Memorial Hospital records in Worcester which are interesting in that they confirm many of Dr. Walker's conclusions, viz., the marked increase in the incidence of the disease of acute appendicitis, which causes vital statistics to show an apparent increase in the mortality, although the mortality according to cases has decreased. I have made a detailed classified grouping of all the cases of 1929, 1930 and 1931 to be compared with a total mortality group of all the cases of 1909, 1910 and 1911, or an interval of 20 years.

Acute Appendiceal Abscess

1929

Male	5
Female	6
	11

Ages

1-10	5
10-20	1
30-40	1

Average duration before admission 5½ days
" " after "

Immediate	6
1 day	3
2 days	1
9 days after delivery	1

WBC 18,600

Deaths—0

1930

Male	5
Female	3
	8

Ages

1-10	1
10-20	1
20-30	0
30-40	2
40 plus	4

Average duration before admission 6 days
" " after "

Immediate	4
1 day	4

WBC 13,460

Deaths—0

1931

Six cases

Ages

1-10	1
10-20	1
20-30	1
30-40	1
40 plus	2

Average duration before admission 6½ days
" " after "

Immediate	4
1 day	2

WBC 16,500

Deaths—0

Total cases	25
Deaths	0

Acute Appendicitis

1929

Male	47
Female	34
	81

Ages

1-10	12
10-20	34
20-30	17
30-40	9
40 plus	7

Average duration before admission 30 hours

Time before operation

Immediate	58
1 day	18
2 days	3
3 days	2

WBC 15,333

Deaths—0

1930

Male	53
Female	40
	93

Ages

1-10	11
10-20	41
20-30	22
30-40	10
40 plus	9

Average duration before admission 1.65 days

Time before operation

Immediate	74
1 day	13
2 days	2
3 days	4

WBC .....

Deaths—1 1.07%

1931

Male	42
Female	71
	113

Ages

1-10	21
10-20	46
20-30	25
30-40	12
40 plus	9

Average duration before admission 2 days

Time between admission and operation

Immediate	95
1 day	9
2 days	5
3 days	3
5 days	1

WBC .....

Deaths—3 2.65%

Total cases	287	
Deaths	4	1.4%

ACUTE APPENDICITIS WITH PERFORATION AND GENERAL PERITONITIS

1929

Male	16
Female	2
	18

Ages

1-10	4
10-20	7
20-30	2
40 plus	4
77	1

Average duration before admission 2.4 days

Time between admission and operation

Immediate	14
1 day	3
3 days	1

WBC 17,292

Deaths—5 28%

1930

Male	8
Female	10
	18

Ages

1-10	3
10-20	5
20-30	1
30-40	3
40 plus	4

Average duration before admission 2 days

Time between admission and operation

Immediate	15
1 day	2

No operation (one case)

WBC 19,600

Deaths—5 28%

1931

Cases 29

Ages

1-10	6
10-20	6
20-30	4
30-40	5
40 plus	8

Average duration before admission 2.1 days

Time between admission and operation

Immediate	27
1 day	1

No operation one case (cardiac)

Deaths—5 17%

Total cases	65	
Mortality	15	23%

GRAND TOTAL 1929, 1930 AND 1931.
5.04% mortality—377 cases

GRAND TOTAL 1909, 1910 AND 1911.
6.34% mortality—142 cases

A decrease of 1.3% in the later period.

DR. CARL M. ROBINSON, Portland, Me.: In the four years prior to June 1, 1932, 1214 appendectomies were done at the Maine General Hospital, 979 for appendicitis and 213 routine appendectomies in the course of other surgical procedures. Of 979 operations for appendicitis, there were 35 deaths, or 3.6 per cent. There were only 46 cases tabulated as appendix abscesses. Six of these died following operation, a mortality of 10.9 per cent, almost three times that of the series.

Two of these deaths followed simple incision without attempt to remove the appendix. Two other appendix abscesses were drained successfully and followed by appendectomy after healing. One case is of sufficient interest to report.

Rather an obese woman in the forties had been operated upon two years before the last admission. Incision and drainage of an appendix abscess was done at this time. She was allowed to go home with a small granulating wound, to report later for appendectomy. She returned two months later with another abscess at the same site, which was drained. After a period of nearly two years, she returned for symptoms consistent with acute appendicitis. At this time appendectomy was done very easily and there was almost no evidence of previous inflammatory changes.

DR. EDWARD H. RISLEY, Waterville, Me.: I don't want to prolong things. I have been delayed and just arrived, and haven't heard the papers, although Dr. Adams kindly sent me his paper to read before the meeting.

I am very glad that there are at least two papers on appendicitis before this meeting, because it seems to me that appendicitis is a subject that we ought to be discussing seriously.

The increased mortality makes it quite evident that neither the laity nor the physician is thoroughly aroused by the seriousness of the situation. I don't know whether the different types of people in different communities are responsible for this. I have a feeling that the laity needs a great deal more intensive education on appendicitis than it is getting at the present time.

I was interested in the symposium held at the Massachusetts Medical Society this year on appendicitis. It seemed to me the papers analyzed the situation extremely well and contributed a good deal of value.

Dr. Adams' paper analyzed entirely a hospital series of cases. I thought it might be of some interest to analyze a small series of private cases in people who perhaps came from a walk of life in which they would be expected to have a little more intelligence in regard to looking after themselves and consulting a physician early.

I have looked up 135 recent cases of acute appendicitis, all of which needed immediate operation and all of which required drainage. Forty-four of these cases were definitely abscessed; two were interesting in that they had perforated into the mesentery of the small intestine and apparently had been present some time before the flare-up. In four, the appendix was completely sloughed off and came away on the sponge used to wipe out the cavity. In five cases only was the appendix not seen or further searched for, when it wasn't readily found.

All recovered and none of them have had recurrences. There was one other case done recently in which the appendix was not searched for, but it is too early to give the final result.

I have one other case, the only case I know of that has had to be reoperated—not in this series—that had a large abscess evacuated and had to be reoperated for a sinus some six or eight weeks later. These statistics taken from private cases would bear out Dr. Adams' contention, that leaving the appendix and doing conservative surgery would seem to be the safe and right thing to do.

I looked up the question of the amount of delay on the part of patients before consulting a doctor at all, and I found that there were 26 of the series who delayed anywhere from three to five days before they called a physician. To sum up hastily: this small series shows that the laity certainly still needs intensive educational campaigns to give it information concerning the acute onset of appendicitis. Most of these cases had been delayed from three to five days and probably could have avoided abscess formation had they called a physician earlier.

The mortality in the series was two cases, both of them neglected, one in which the parents did not call the doctor for six days and another case in an old lady in which the doctor was not called for five days.

Dr. Arthur L. Chute, Boston, Mass.: There is one thing I might suggest that may have a slight bearing on the increased mortality of the acute appendix. I have seen within the last few years two fatal cases of appendicitis in which a delay in operation was due to extra care, to a bending backward on the part of the surgeon. The genito-urinary surgeons have rather "ridden" the general surgeons on the frequency with which they have taken out an appendix where afterward the patient passed a right-sided stone. These cases may have been the result of this.

The delay in the fatal cases I saw, which on operation proved to be suppurative appendices, was due in each instance to the fact that house officers in going over the urines had found crystals of the acid sodium urate which, as you know, have the color and occasionally the size of a red blood corpuscle; they do, however, vary greatly in size so that one sees crystals the size of a red blood corpuscle and others that are much larger. In these two instances the mistake was made of thinking that these were red corpuscles and the symptoms were due to a renal stone. In both the cases there was a delay of quite a number of hours, overnight in one case. As I have seen two instances where an attempt to be most careful in diagnosis was followed by this result, I wonder if the aggregate of similar cases may not be considerable and may not perhaps be one element in the increased mistakes of appendicitis. In these cases, not only was there a mistake in regard to the nature of one finding, but an undue importance was placed upon one symptom rather than upon the weight of clinical evidence.

Dr. David Cheever, Boston, Mass.: I have enjoyed both Dr. Walker's and Dr. Adams' papers extremely. I feel as though the question of reoperation on a patient in whom an appendix abscess has been drained is not so simple as will appear from these statistics, that is, the statistics seem to show that reoperation is not necessary.

I have in mind a man, very valuable to the community, who was operated on in midocean and an appendix abscess drained. He recovered by the grace of God and the timely intervention of a pediatrician as the surgeon. Then there came up the question of what he would do when he came home. He came under my care. It was thought best not to reoperate for the removal of the appendix. A year later he had an acute appendicitis. The old stump was dug out and since then he has been very well.

I can see that reoperation before suppuration was established would have been better. So far as I can judge, this would be my impression; given a fairly young person, a good operative

risk, reoperation for removal of the appendix would be indicated; in an elderly person, not so good an operative risk, it would be better to wait.

I should like to ask Dr. Walker two questions, especially as to the hospital clinic. What does he think about the so-called non-operative treatment? Does he advocate immediate operation after diagnosis, or does he advocate delay in certain cases? And another question: What does he do about the patient admitted with a diagnosis of subacute or chronic appendicitis? The attending physician has made that diagnosis; there is usually a note from an outside x-ray man who says the x-ray shows evidence of appendicitis; nevertheless, when he takes the history, he fails to get any pathognomonic history at all, and the examination is perfectly negative.

What does he do? If he doesn't remove the appendix, he disappoints the family doctor, and the family, and the patient may drift into hands less safe than his own. It is pretty sure to be removed by somebody. If he does remove it, he probably isn't quite honest with himself. What does he do?

DR. ALFRED M. ROWLEY, Hartford, Conn.: I would like to ask Dr. Walker and Dr. Adams if they have noticed the presence of Bacillus Welchii in their fatal cases, which seems a very important factor in many of our fatal suppurative appendiceal cases.

DR. WALKER: I think I won't take time to show more slides now. I learned a lot about mortality rates and percentages from this study.

As we have shown, the literature demonstrates numerous articles pertaining to the rising mortality in appendicitis. Apparently they show a rising mortality per 100,000 population, but that is a decidedly different matter from the mortality per incidence of operation, which is unquestionably lower. This apparent difference in mortality rate is what bothered us considerably and is the question we have been threshing out for the past two and a half years.

Probably the chief reason that more people are dying as a result of the treatment of appendicitis is that there is an increased amount of surgery aimed at appendicitis. I am not quite sure that this surgery represents the highest grade; however, this may or may not be.

In answer to Dr. Cheever's question as to what we do with our general peritonitis cases, I might state that it has been the policy of the hospital as a whole to treat these as emergency conditions with operation carried out as soon as possible after entrance to the hospital. Personally, I feel that these patients could well be treated by having a certain amount of time spent on them previous to operation, giving them fluids, etc., and thus making them better surgical risks.

The mortality twenty years ago being about 58% and now about 33%, on our service we feel that the mortality is still too high in general peritonitis, and we have recently undertaken the treatment of fifty cases of general peritonitis following the suggestions of Ochsner. As yet we have no statement regarding our results that we wish to publish, but we hope that we can lower the mortality 33 1/3%.

In answer to the question as to what we do about chronic appendicitis, I would state the following: In the treatment of this type of case we are responsible to the patient, of course, also to the hospital, and are vitally responsible to the large number of students. Therefore, regardless of what the diagnosis may have been when the patient was admitted, and regardless of who sent the patient to the hospital, we absolutely decide for ourselves whether it is chronic appendicitis, of which I personally think there are very few instances, and if we are not convinced that there is pathology of the appendix, by ruling out other pathology or functional disturbances of other organs or systems which might have given a certain symptomatology, or in other words if we cannot prove that the case is one of chronic appendicitis, the patient goes home. We have done this for about four years with very few regrets.

I might say that the other services are operating rather freely for chronic appendicitis, but not ours. We feel as a consequence of our policy that we have saved a considerable number of people some unnecessary surgery.

Regarding the question of infection due to B. Welchii, I might say that we have had two cases which showed this organism. There is one striking fact in the bacteriology in the fatal cases, namely, that there was a considerable increase in the number of instances of hemolytic streptococci in the second period as compared with the first. However, the series is perhaps too small to enable us to draw a conclusion. It is possible that the number of cases with hemolytic streptococcus may be increasing. Of this I am not quite sure.

DR. ADAMS: In answer to Dr. Rowley's question, I did not find any mortalities due to the bacillus of Welch. I find that in most of our cases, in looking over the records, our mortalities were largely due to streptococcus.

I thought that the Ochsner treatment had almost gone into complete disrepute. I notice mention of it in the literature, however, particularly the loose-leaf volumes. I remember very well in the Army we received orders from the Surgeon General that anyone who tried the Ochsner treatment should be subject to court martial.

WHAT IS NEPHROSIS?*

BY HENRY A. CHRISTIAN, M.D.‡

THE title "What Is Nephrosis?" is a query which I have been asked to answer. I would answer this by saying, nephrosis is a word, historically and etymologically illy adapted to its supposed meaning, which should be used as the name of a clinical syndrome that otherwise would require many words to describe or define, but that it is the name of neither a disease entity nor of a definite pathological lesion. Leiter† in a most admirable review of the subject has described what he understands by nephrosis as follows:

> "It is a rare chronic disease of children and young adults, usually insidious in its onset and without any definite relationship to infectious diseases in most cases, although in some the condition seems to follow chilling, upper respiratory infections, or active lues. The underlying cause is not known. The clinical features are both positive and negative, the latter as important as the former. Among the positive findings are subcutaneous edema and fluid in serous cavities, albuminuria, oliguria, waxy pallor, typical urinary sediment, good renal concentrating ability, decreased protein and increased lipoid content of the plasma or serum and decreased basal metabolic rate. The negative or absent findings are hematuria, increased blood pressure, cardiac hypertrophy or enlargement, abnormal peripheral or retinal arteriosclerosis for the age of the individual, renal insufficiency and true uremia. The course is typically chronic, with remissions during which all of the signs and symptoms, with the exception of albuminuria, may disappear. Complete recovery may occur after months or years of a checkered course of ups and downs. Often, however, the general state of the patient is such as to predispose him to various acute and chronic infections, particularly pneumococcal in origin, the outcome of which is very likely to be fatal."

You see that this definition groups together certain positive conditions, but to properly limit the term nearly as many things must be stated as necessarily absent, or otherwise the condition is not nephrosis. In other words, it is a very complex definition that delimits the term very narrowly, when all parts of the limitations expressed above are maintained, both the positive and negative.

Historically the word "nephrosis" was introduced by Friederich Müller in 1905 at the Meran meeting of the German Pathological Society to separate degenerative from inflammatory lesions of the kidney and was a pathological rather than a clinical term. Many varieties of renal degeneration rapidly came to be referred to, by pathologists, as nephroses. One of the best understood forms of degenerative lesion in the kidney is that which results either in man or experimental animals from poisoning with bichloride of mercury. Histologically the lesion is typically a degenerative one. The clinical picture has practically no resemblance to nephrosis as defined by Leiter.

As time has gone on pathologists have applied the term "nephrosis" to very many lesions of the kidney which are in essentials degenerative changes rather than inflammatory, and it was this distinction between degeneration and inflammation that Müller sought to make by introducing the term "nephrosis" as opposed to "nephritis".

If the terms "nephrosis" and "nephritis" are considered from the point of view of their etymology, it would appear that "nephrosis" is not a very satisfactory term to express the idea of degeneration, for according to Mosenthal "nephrosis" by its derivation means "full of kidney substance".

Müller objected to the use of the term "nephritis" because he believed "nephritis" meant inflammation. Etymologically*, however, "nephritis" does not mean inflammation but rather a disease of or affecting the kidney. Apparently in classical Greek, words ending in "itis" were epithets or adjectives, and the word "nosos" or some other word was understood, and one finds, in Thucydides, Nicias saying that he has "nosos nephritis". In one place Hippocrates apparently used the word to mean gravel or stone in the kidneys and in another place uses the word "phthisis nephritis", which apparently means atrophy of the kidneys. Just when the ending "itis" began to be used to mean inflammation is not clear.

In other words, it would seem that from an etymological point of view it was not necessary to introduce the term "nephrosis", since "nephritis" reasonably could mean degeneration as well as inflammation and that actually "nephrosis" by its derivation does not mean degeneration. So it might be regarded as unimportant to attempt to separate inflammation from degeneration by the use of particular terms.

*Presented at a combined meeting of the Pediatric Section of the New York Academy of Medicine, the Philadelphia Pediatric Society and the New England Pediatric Society at Boston, October 15, 1932.

†Leiter, Louis: Medicine, 10: 135, 1931.

‡Christian—Physician-in-Chief, Peter Bent Brigham Hospital. For record and address of author see "This Week's Issue," page 160.

*For much of this information I am indebted to the late Professor Clifford H. Moore, Dean of the Faculty of Arts and Sciences and Professor of Latin, Harvard University. For further discussion of this see Transactions of the Pathological Society of London, 40: 346, 1889, where similar statements in regard to the termination, "-itis," appear.

Furthermore, it is generally believed that inflammation is the response of living tissue to injury and in that sense evidences of injury reasonably might be regarded as the first stages of inflammation.

As you study patients grouped under the term nephrosis, you are more and more impressed with the idea that two clinical characteristics dominate the picture, edema and albuminuria. From what we know of the mechanism of edema, you come to regard the albuminuria as the important causative factor in producing the edema. Albumin loss can explain the edema, the low plasma protein, the change in albumin-globulin ratio and the cholesterol increase in the blood; other features seem of secondary import.

What then is the explanation of the albuminuria? Foreign protein in the circulating blood would be excreted through the glomerular membrane, but no studies are convincing that there is abnormal or foreign protein in the blood plasma or in the urine of these patients. Nonforeign protein, i.e., natural human plasma protein, will not pass through the normal glomerular membrane.

Degeneration of tubular epithelium could supply albumin to constitute albuminuria but would not be capable of supplying so great an amount of albumin over so long periods of time, as occurs in the urine of so-called nephrosis. Certain fish with kidneys having no glomerular structures do not develop albuminuria when substances, which do produce albuminuria in fishes possessing kidneys containing glomeruli, are injected intravenously. Very slight damage to the glomeruli, such as blocking the renal artery for a brief time, will cause albuminuria. There is histological evidence that the space about the glomerular tuft contains precipitated albumin when the urine during life has contained albumin. All this evidence supports the view that the albumin in so-called nephrosis leaves the kidney through the glomerular membrane because the membrane is abnormal. Not infrequently we are compelled to accept evidence of deranged function as indicative of a lesion, when we cannot demonstrate any organic abnormality in the given structure. That seems to be the situation here in those rare cases in which with marked albuminuria we cannot demonstrate a lesion of the glomeruli by the usual technical methods of pathological histology.

Much more important from the present clinical viewpoint is whether there is a distinct disease entity as represented by the definition of nephrosis, and if so, whether it has a recognized specific pathological lesion. If a large number of adult patients are studied, who present themselves with edema and albuminuria as the striking features, several kinds of cases will be encountered. The more usual of these is the patient who shows some deviation from the narrow limitations of the definition of nephrosis as given above such as agreeing in all respects except that the urine shows blood cells in moderate amount, or as agreeing in all respects except that there is nitrogen retention or lowered phthalein excretion, or agreeing in all respects except that the blood pressure is elevated, etc., and these invariably at autopsy show kidneys with the lesions of a glomerulonephritis. Another type, which is a much more unusual finding, is the one that agrees in all respects to the limitations of the definition when first observed. However, if these latter patients are observed at intervals over a period of time, it is exceedingly rare among adults to find one that continues to stay within the limits of the definition, and when they do not, at autopsy they, too, show the renal lesions of a glomerulonephritis. Finally there is in adults the exceedingly rare case which continues to remain within the limitations of nephrosis as defined by Leiter. In such a patient the pathologist may not find the lesions of glomerulonephritis. After some twenty odd years of interest in renal conditions so far as adults are concerned, I have seen but one patient, who continued to show the exact clinical features of the definition of nephrosis, and when this patient died, he turned out to have amyloid disease not only of his kidney, chiefly in the glomeruli, but of his liver and spleen, though he had no one of the usual causes of amyloid. Except for this one patient, all the other cases that I have ever had the opportunity of studying have at some time shown departures from the clinical picture as described above, and when these patients were followed through to death, autopsy invariably has shown quite obvious glomerular lesions of the usual type found in glomerulonephritis.

As a result of all of this I have come to the conclusion that in adults so-called nephrosis is but a phase in the development of glomerulonephritis. One of these patients conceivably might die at a time when histological examination showed almost no evidences of glomerular lesion. A very few such cases in adults have been reported in the literature, though most pathologists studying cases of this type do report some glomerular lesion.

In children, apparently, it is very much more common to see patients who at autopsy show practically no glomerular lesions than is the case in adults, and their clinical course seems different from that in adults in several minor respects. It seems to me, however, that it is improbable that there is a distinct disease, nephrosis in the narrow sense of the term, which occurs in children but does not occur in adults. Rather does it seem to me probable that the difference is that between childhood and the older period of life and a difference in duration and method of termination rather than a

fundamental difference in the nature of the disease. Between the Brigham Hospital and the Children's Hospital there is a street which I like to call "Twelve Year Old Lane" on the two sides of which dwell patients who differ the one from the other only in being more or less than twelve years old, with all the many temperamental and other differences that exist between childhood and maturity and which affect their diseases and their normal reactions.

In my judgment the term, nephrosis, is convenient as a name for a clinical syndrome, which is but a phase in the disease glomerulonephritis, and that in neither adults nor children is nephrosis a definite disease entity or a distinctive pathological lesion.

HELIOTHERAPY IN THE TREATMENT OF SURGICAL TUBERCULOSIS*

BY JOSEPH S. BARR, M.D.†

THE treatment of various diseases with sunlight, either natural or artificial, has been stimulated within the past decade to an unprecedented degree. All of us, when spring comes, or, if we are more fortunate, on a winter's trip South, look on the sun and find it good. Certain medical men have looked on the sun and found it good for everything, and their word has been so weighted with authority and has been backed so strongly by those commercial firms interested in the sale of carbon arc lamps, sun lamps, quartz glass, and tickets to Florida, that a great percentage of the public and a possibly smaller percentage of doctors have become true sun worshippers. Unlike many other cults, this religion has a great underlying foundation in truth. To the sun worshipper everything beneficial is attributed to his god. To the Philistines in the other camp nothing has been proved. It seems worth while to reëvaluate the evidence and attempt to put the use of heliotherapy in surgical tuberculosis on a sound basis.

Sunlight is that particular band of radiant energy emitted by the sun which is visible to the eye. The sun's spectrum includes not only visible light, but also, on one side, shorter invisible ultraviolet rays, and, on the other side, longer, also invisible infra-red rays. As sun radiation reaches the earth at sea level, the wave length extends from 290 Mu to 5 U. The total percentage distribution of energy is about 1 per cent ultraviolet, 40 per cent visible, and 59 per cent infra-red. In any discussion of heliotherapy we must remember that this invisible ultraviolet and infra-red radiant energy constitutes about 60 per cent of the total radiation.

Let us first briefly review the known proved effects of heliotherapy. (1) When the skin is exposed to the sun's rays, there is an immediate hyperemia of the whole body due to radiant heat. This hyperemia is not restricted to the irradiation part and is due to the longer wave lengths of the spectrum, i.e., the infra-red rays.

(2) There is an erythema localized sharply to the irradiated area. There is dilatation of the skin capillaries. This is caused almost wholly by the ultraviolet radiation. If the radiation is carried on beyond this point "sunburn" occurs. Sunburn is a purely lethal phenomenon and denotes death of skin. It may be classified in severity much as ordinary burns are. It is characterized histologically by serum extravasation, distention of capillaries, and death of epidermal and dermal cells extending down into the germinal layer.

(3) The third effect of sunlight on the skin is pigmentation. The normal skin pigmentation, which determines whether one is blond or brunet, is due to intracellular melanin. The pigmentation following heliotherapy is of a more or less transient nature requiring exposure to sunlight at fairly frequent intervals if it is to be maintained. It also is due to melanin deposit, but the pigment is extracellular. What is the function of this pigment?

(a) It is a protection against excessive irradiation. If a child with no tan is exposed to sunshine, there are definite immediate changes in blood pressure, pulse, red blood count, white blood count, and blood sugar. After this child has become thoroughly tanned, these changes no longer occur. In addition, the well-tanned skin is no longer susceptible to sunburn.

(b) Pigmented skin warms more quickly and holds more heat than the untanned skin. The pigment stops solar radiation and transforms it into skin heat which is rapidly dissipated.

The penetration of body tissues by the various wave lengths of the sun's spectrum has been carefully investigated and it is known that the power of penetration increases proportionately to the wave length. Skin 1 mm. thick stops over 99 per cent of the ultraviolet rays. The longer visible rays penetrate skin with greater ease while the infra-red rays may pass through several centimeters of skin and subcutaneous tissues.

We have noted the effect of solar radiation on the skin; what is its action on the body in general and on the deeper structures? There

*Read before the Boston Orthopedic Club, April 11, 1932.

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is a general belief that blood pressure is lowered slightly during and after irradiation, and this is supported by experimental evidence. The fall averages between 5 and 10 mm. Hg. There is usually no change in body temperature. Pulse rate is usually accelerated 1-15 beats per minute during the insolation period, but falls to normal immediately afterward.

Experiments on animals have shown that hyperemia produced by irradiation is present not only in the skin and subcutaneous tissues but also in the spleen, kidneys, liver, bone marrow, and lungs. If the insolation is intense there may be actual hemorrhage into the liver spaces and alveoli of the lungs. Here we may find the physiological answer to the established clinical fact that intense sunshine is contraindicated in active pulmonary and bone tuberculosis.

There is a great mass of experimental evidence concerning the effect of solar and ultraviolet radiation on the blood picture. These experiments have been carried out under the most diverse conditions, at high and low altitudes, in cold and heat, on well and ill children, adults, and animals, rigorously controlled and not controlled at all. It is not surprising, then, that for every group of experiments showing certain positive evidence, there can be found other experimental work with negative or even contrary results. Space does not permit careful weighing of this evidence here, but the consensus of opinion is about as follows:

(1) The hemoglobin content of the blood is not particularly affected by heliotherapy. Careful studies on the Eskimos, Arctic explorers and animals kept in darkness but on adequate diets, show that the hemoglobin level is normal. The change from our pale anemic winter appearance to the "full-blooded" healthy vacation suntan is due to two factors;—first, increased skin pigmentation, easily mistaken for increased hemoglobin content, and, secondly, dilatation of skin and mucous membrane capillaries. This allows more blood to reach the surface of the body and substitutes the full-blooded flushed face for the pseudo-anemic one.

(2) The red blood count and hematocrit changes due to sunshine, like the hemoglobin, are negligible. It is only under prolonged periods of total lack of light that any significant blood changes are noticed in healthy animals or human beings.

(3) The total white blood count also remains practically unchanged by heliotherapy. On the other hand, there is an increase in the percentage and total number of lymphocytes with a corresponding decrease in polymorphonuclear cells when a healthy person is exposed to sunshine.

There has been a certain amount of experimental work on the immunological changes in irradiated blood. The bacteriocidal power of blood, the agglutinins and precipitins in the blood of a healthy man have been found to be temporarily raised by heliotherapy. On the other hand, experimental work on a man in poor health gave exactly opposite results. All of these immunological factors were *depressed* rather than raised by heliotherapy. In both cases the changes were temporary and return to the normal level occurred after a few hours. Here also we have experimental evidence which tends to show that if a patient has an active tuberculosis or other acute disease process, heliotherapy may actually exert a deleterious effect particularly if massive doses are used.

W. M. Phelps, working on the hypothesis that the longer ultraviolet region of the spectrum, from 330 to 380 Mu., was specific in tuberculosis, irradiated guinea pigs, which had been inoculated with a virulent strain of tubercle bacillus, found that they lived longer than control animals not irradiated. He used a light filter which stopped all the rays shorter than 330 and longer than 380 Mu. This work is important, being the first definite clue as to specificity of any portion of the sun's spectrum on tuberculosis. It should be repeated using a larger number of animals.

What is the effect of heliotherapy on metabolism? In general there is practically no change in the basal metabolic rate due to insolation. Over long periods of time, on similar diets, animals in darkness tend to gain weight a little more rapidly than those getting heliotherapy. Heliotherapy has been shown to have no effect on the growth curve of animals.

The effect of irradiation on calcium and phosphorus metabolism has been carefully studied. It has been shown that the amount of calcium and phosphorus absorbed from the G. I. tract is increased. The blood analysis shows an increased phosphorus level and a decreased calcium level, so that the product of the two remains constant. It is not the purpose of this paper to discuss the effect of heliotherapy on rickets and tetany, which diseases are specifically linked with deficient calcium and phosphorus metabolism. There is no evidence that surgical tuberculosis is dependent upon or influenced by changes in mineral metabolism.

There is one more factor in the physiology of a normal person influenced by irradiation. That is the psychic change. All writers agree that heliotherapy in correct dosage produces a feeling of well-being, mental and physical, finding expression in freedom from worry, joy of living, and lack of fatigue. The effect of overdosage is quite the opposite.

With this background of knowledge of what heliotherapy does to the organism in general, let us examine critically what it does to patients suffering from so-called surgical tuberculosis.

Dr. Robert W. Lovett, whose fresh and in-

spiring outlook was responsible for so many advances in orthopedic surgery, had his attention drawn to the striking results obtained in the treatment of surgical tuberculosis by Dr. Rollier at Leysin, Switzerland. He immediately introduced this method of treatment of such cases in the New England Peabody Home for Crippled Children at Oak Hill, Newton Center, Mass. This was in 1914. Heliotherapy has been in constant use there for the past eighteen years. In addition, the quartz mercury vapor and carbon arc lamps and ultraviolet transmitting glass have been added to our armamentarium and used in varying degrees in the treatment of the cases. What can we say for this method of treatment?

A walk through the wards, a careful clinical examination of the cases, and comparison of serial x-rays all tend to confirm our first impression that these children do remarkably well. A glance at the mortality figures is also illuminating. During the ten-year period from January, 1920 to January, 1930, 183 cases of bone and joint tuberculosis, all acute, were admitted and treated at the Peabody Home. Of these, 28, or 15.3 per cent have died from all causes, either in the Peabody Home or after discharge. This uncorrected mortality compares most favorably with the mortality rate in other clinics. Nineteen of the 28 cases had tuberculosis of the spine, seven of the hip, two of the knee. There were no deaths in children with tuberculosis of the smaller bones or joints.

What were the causes of death? Eleven cases had amyloid disease due to secondary infection of deep abscesses with resultant renal and liver damage. Five cases developed tuberculous meningitis. Four cases died of acute pulmonary tuberculosis. Two cases developed miliary tuberculosis. The remaining six deaths are of irrelevant cause or cause unknown.

It is interesting to note that joint tuberculosis of itself does not cause death. Secondary infection of deep-seated lesions with resultant chronic sepsis and amyloid is the chief cause of death. Meningitis, miliary tuberculosis and tuberculous pneumonia are the other three complications occurring most frequently which lead to a fatal outcome.

Rollier states that the degree of skin pigmentation is a crude index of the condition of the patient and the tuberculous lesion. If this were true, then we should expect that the cases which have died would show less tendency toward pigmentation than the general average. We have found no preponderance of mortality in either blond or brunet type. Also, those cases dying at the Peabody Home have almost uniformly been well-tanned by exposure to the sun.

Many writers have noted that heliotherapy stimulates the healing of sinus tracts. At the New England Peabody Home we feel that the local hyperemia of direct sunshine causes increased discharge from sinuses and stimulation of granulation tissue, with resultant tendency to more rapid healing. This is a clinical impression not susceptible of statistical or experimental proof. The really important factors in the healing of discharging sinuses are, as we all know, adequate drainage, immobilization of the joint, and the resistance of the patient. Sunshine is a secondary, probably nonspecific, aid to these factors.

Dr. Ghormley, in studying a group of 63 children at the Peabody Home, suffering from Pott's disease, was impressed with the fact that healing of the spine lesion and disappearance of the paravertebral abscess were accompanied by calcification in the region of the abscess and in the primary lesion, demonstrable by x-ray. This calcification takes place quite as readily in cases without draining sinuses as in the others. He felt that this calcification was a real reparative process and was stimulated by heliotherapy, as he had failed to note such calcification in cases seen in out-patient clinics, that were not receiving light therapy. Here again we cannot be too dogmatic. To my knowledge, no one using heliotherapy on such a group of cases has checked their progress with a similar control group treated identically except for insolation. In the autopsy room and under the microscope pathologists have demonstrated many times that tuberculous lesions do heal with calcification in cases never receiving heliotherapy.

The most important evidence from our work at the Peabody Home concerning the effect of sunshine was gathered by Dr. Hoeffel. He selected forty children with joint tuberculosis and divided them into four groups. In all of them the diet and orthopedic care were standardized. The average age of the four groups was essentially the same. The one variable factor was sunshine. One group, used as a control, was kept in the ward, never being exposed to any form of direct light rays. The second group was exposed to direct sunshine every day, weather permitting. The third group received their heliotherapy through ultraviolet transmitting glass. These children were kept constantly on a porch, the roof and wall of which were covered with Corning or Vita glass. The fourth group received daily exposure to the quartz mercury vapor lamp. The period of study extended over two years. Frequent careful observations were made on the red blood count, hemoglobin, hematocrit, and total and differential white blood count. An analysis of the results of this study shows that the changes in the peripheral blood were practically identical in the four groups. The control group had as high a hemoglobin and red blood count and practically the same hematocrit reading and total and differential white blood count at the end of the experimental period as did the other groups receiving various types of light therapy.

They gained weight in the same manner, and clinically their tuberculous lesions seemed to do as well as those of the children whose bodies were thoroughly sun-tanned.

It would require a much larger group of children, with exactly comparable lesions, treated over a sufficient length of time to produce arrest of the disease process, and an exact comparison of end results between irradiated and non-irradiated children to settle the matter authoritatively. I am well aware that Rollier in Switzerland, LoGrasso at Perrysburg, Phelps in New Haven, and many others feel that the sun's spectrum in whole or in part has a specific effect on surgical tuberculosis. The evidence I have presented offers an extremely shaky basis on which to support that thesis. I feel that we must bring in the Scotch verdict "not proven".

Everyone who has observed Rollier's cases agrees that they do extremely well. So do our children at the New England Peabody Home and at many other orthopedic hospitals scattered over the globe where heliotherapy is being carried out in rigorous régime. The results are as much superior to older methods of out-patient treatment as are the results at Saranac superior to ambulatory treatment of pulmonary tuberculosis.

Exactly what are the changed factors?

1. *Rest.* Our patients go to bed and stay there until they are far on the road to recovery. The affected joint is kept at rest by the use of adhesive skin traction for tuberculous hips and knees, splints for ankles, wrists and elbows, and hyperextended plaster shells for Pott's disease. Abscesses are let severely alone. Every effort is made to keep them from becoming secondarily infected with pyogenic organisms. Chronic sepsis in a deep-seated tuberculous joint, not invariably, but frequently, leads to amyloid disease and death.

2. Good food, fresh air and adequate medical and nursing care all tend to increase the patient's resistance and so aid in the reparative process.

3. Sunshine, producing sun-tanned bodies, a happy mental outlook, increased muscular tonus, and possibly stimulating more rapid calcification of abscesses and healing of sinus tracts is a non-specific but valuable aid in treatment.

All these things Rollier had in mind when he began writing about the "sun cure" in 1905. If we include these factors under the term "heliotherapy" we may truthfully say that with Rollier began the modern concept of the treatment of surgical tuberculosis. Add to that the invaluable procedure of the internal fixation of tuberculous joints by arthrodesis and our present armamentarium is complete. We lack but one thing, sought after by all workers from Koch to the newest tyro in the laboratory; a specific cure for tuberculosis.

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HEALTH EDUCATION IN THE CITY OF BOSTON

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(Concluded from Page 88, issue of January 12)

IV. PAROCHIAL SCHOOLS

Forty-three parishes in the City of Boston maintain parochial schools, fourteen of which maintain high school departments in addition to elementary schools. These schools are supported by the Catholic Church. The enrollment as of October 1, 1931, was 30,902, of which 28,532 were in the elementary grades (I to VIII inclusive), and 2,370 in the high school grades (IX to XII inclusive).

There is no special personnel charged with the development and supervision of the health program in these schools. The Diocesan Supervisor of Parochial Schools and a group of Community Supervisors include this with their direction of other school activities. The principal in each school is relieved of all teaching duties and is therefore able to devote her entire attention to the administration and the supervision of instruction.

A. Elementary Schools (Grades I-VIII)

1. *Coöperative Activities*

As described in the portion of this survey devoted to the public schools, there are certain coöperative activities carried on in connection with the school health program which make a definite contribution to health education.

a. *Correction of Defects.* Nursing service and the services of a school physician are supplied to the parochial schools by the Boston City Health Department. At the time of the annual physical examination made by the doctor with the assistance of the nurse, physical defects are recorded on cards kept on file in the principal's office. Both parents and classroom teachers are notified of all children's remediable defects.

*Parsons and Turner—For records and addresses of authors see "This Week's Issue," page 160.

Correction is secured through the nurse who visits homes to encourage the correction of defects by the family physician. She may also take to clinics children who cannot afford to go to their family physician. Re-examinations of individual children by physicians occur as needed.

The Guild of St. Apollonia is very active in helping to secure the correction of dental defects. Each fall, dentists who are members of this guild examine the teeth of parochial school children. They also supply a bus and matron to take children to the Forsyth Dental Infirmary for treatment.

b. *Control of Communicable Disease.* The control of communicable disease is placed entirely in the hands of the medical and nursing services, and is carried on in an eminently satisfactory manner identical with that in operation in the public schools.

c. *Interpretation of the School Health Program to the Home and Coöperation with the Home in Health Training.* The public health nurse is exceptionally important in securing school and home coöperation. Most of the school nurses are familiar with the home environment of practically all of the children in their districts. Parents visit the school often, and teachers (all of whom live in the immediate vicinity of their schools) hold frequent individual conferences with them in regard to their children's health problems. Parish priests and other priests delegated by them are active in promoting home and school coöperation. There is a distinct value in the close coöperation of the church, home and school.

d. *Coöperation with the Physical Education Program.* The time allotment for physical activities and recess periods is 150 minutes per week in Grades I to III inclusive, and 140 minutes per week in Grades IV to IX. A graded outline of instruction for physical education is included in the Printed Course of Study for the Parochial Schools. In practically every school, a special teacher is provided for physical training. Organized physical activities are carried on each day and there is a weekly supervisory period under the direction of the special teacher. Special emphasis is placed on the health value of physical activities.

e. *Maintenance of Hygienic Classroom Conditions.* The provision of a clean, well-cared-for school environment serves as an excellent stimulus to pupils for the practicing of health habits. In these schools, children are made to feel a responsibility for the care of their school surroundings. All of the parochial school buildings visited are well-lighted and possess satisfactory heating and ventilating equipment. In some of the elementary schools visited, classes are large.

2. *Routine Procedures*

As we have seen, certain routine procedures in the school day provide opportunity for health training.

a. The *weight and height* of each pupil are recorded once yearly, in the fall at the time of the annual physical examination. Undernourished children, who are under the supervision of the school nurse, are weighed more frequently.

b. The teachers in most schools have, through *daily inspection,* developed excellent habits of cleanliness on the part of their pupils. Teachers as well as school nurses assume responsibility for detecting signs of communicable disease or other abnormal physical conditions among the pupils in their classrooms.

c. An arrangement is made in most schools whereby children may purchase milk for a *mid-morning lunch.* From time to time, when funds are available, lunches including milk are given free during the school session to groups of undernourished children. All of the parochial schools operate on a two-session plan and pupils in most cases live in the immediate neighborhood, so that it is not necessary for the school to arrange for the serving of a noon meal.

d. At various times during the school session at the discretion of the classroom teacher, brief *relaxation periods* of two to three minutes are observed, especially in the primary grades. In all grades, relaxation is also provided through recess periods.

3. *Direct Classroom Instruction*

In 1923, a printed Course of Study in all subjects for Grades I-VIII of the Parochial Schools in Boston was published. The health section is now being revised into a new health education outline and will be issued as a separate pamphlet. The courses in History, Civics, Geography, Spelling and Penmanship have already been published. The new course in Health Education is being prepared by a committee of five teachers (representing different sections of the Boston Diocese) under the direction of the Diocesan Supervisor. This course of study is supplemented in the elementary grades by the use of a publication issued by the National Catholic Welfare Conference, *Health through the School Day.*

Health Lectures and exhibits are included as a part of the annual Institute Program for teachers in the Boston Diocese. Supplementary teaching material is also distributed at this time. Individual principals are also active in securing such material from outside agencies. In addition to materials and speakers supplied by the New England Dairy and Food Council, different classrooms are using booklets and posters from the following groups: Cleanliness Institute, Massachusetts State Health Department, Metropolitan Life Insurance Company, and the United Fruit Company. In the past some assistance in teaching health has been given to

teachers in the parochial schools by a worker from the Boston Tuberculosis Association.

The minimum time allotment for health teaching in Grades I-VIII is 30 minutes per week, but some schools devote more time to the teaching of this subject. Textbooks and health readers are found in all schools. Each school may select these from an approved list.

In many schools the health education program for the year is summarized on the occasion of the commemoration of Child Health Day in May. Each class usually provides one feature of this program, such as a play, drill or song. This feature provides an occasion for the checking of accomplishment in health education.

In the classes visited, individual teachers are doing an excellent piece of work in this subject as well as in others of the curriculum. Incidental health teaching is often accomplished in connection with other subjects. With the cooperation of art instructors, posters are on exhibition in nearly every classroom. The English period in upper grades is often spent in writing compositions with health value. Pupils in the sixth grades compete in the prize essay contest sponsored annually by the Guild of St. Apollonia. Prizes are offered to the three pupils who present the best essays on some selected topic relating to dental health. This year the topic was "What I Must Do to Have Good Teeth."

In the upper grades, there is a general tendency toward developing pupils' responsibility for their own health and for the health of the community in which they live.

B. Senior High Schools (Grades IX to XII)

Medical and nursing service identical with that described under the Elementary Schools is provided for pupils in High Schools. The same types of coöperative activities also exist.

In the girls' high school which was visited, pupils are required to attend a series of lectures on Personal Hygiene, one 45-minute period per week during their first year. Girls pursuing the academic course take further work in Hygiene, with special reference to Home Making, one period per week during their third year. In some schools, sets of health textbooks are provided for all pupils.

Integration of health instruction with the following subjects of the curriculum was noted:

Biology. This course is required of all girls in the Business Course for five periods per week during their fourth year. Excellent visual materials including models and charts are in use. Special emphasis is placed upon the public health aspects of biology.

Foods. Third-year girls in the Business Course take this course which includes instruction in food values and menu-planning as well as actual practice in cookery.

General Science. Opportunities for health teaching are recognized in connection with many phases of this course, required of all girls five periods per week during their freshman year. Experiments on pasteurization, ventilation, and the growth of bacteria are carried on.

Physical Education. All girls are required to spend two 45-minute periods per week in the gymnasium. Here the instructors emphasize the value of good posture and teach the girls to enjoy healthful play and exercise.

Sewing. Instruction in clothing and dress appreciation are included in this work which is taken by all girls during their freshman and sophomore years.

V. ORGANIZATIONS WHOSE FIELD IS BROADER THAN THE CITY OF BOSTON BUT WHICH CONTRIBUTE DIRECTLY TO HEALTH EDUCATION IN THE CITY

It should be clearly understood that the activities of the following organizations are available for the entire State of Massachusetts and in some cases for a larger area. Each, however, due in part to the location of its central offices in Boston, makes a special and definite contribution to Health Education in the city. Limited space will allow only a listing of activities.

A. Governmental Agencies

1. *Massachusetts State Department of Public Health.* Health Education activities are most extensive in the Division of Child Hygiene, four of its thirty-one staff members working mainly in this field. The Division of Adult Hygiene and the Division of Tuberculosis also have important educational functions.

The following different types of service are available without charge to persons and groups within the Commonwealth:

a. *Lecture Service.* All members of the department are available for lecture appointments. (Three hundred lectures were given in Boston in 1931.)

b. *Radio Broadcasts.* (In coöperation with the State Medical Society.)

c. *Publications* are three in number.

(1) *The Commonhealth*—a quarterly publication of department news, researches, and timely information.

(2) *Tidings*—a less formal bi-monthly mimeographed booklet. (Discontinued September, 1932.)

(3) The *Dental Bulletin,* published monthly during the school year for dental workers.

d. *Newspaper Publicity.*

e. *Library.* Texts, reference books and magazines may be used at the State House.

f. *Consultation Service.* (Concerning health education projects.)

g. *Health Education Materials.* (a) Motion

Pictures, (b) Film Slides, (c) Lantern Slides, (d) Exhibits, (e) Posters, (f) Pamphlets, (g) Prenatal and Postnatal Letter Service, (h) Plays, Stories and Rhymes.

2. *Massachusetts State Department of Education.* This department has recently published a course of study in Health Education for the elementary schools and is at work on an outline for secondary schools. Mention has been made of the Department's contribution through its Division of the Blind. Extension Courses in health and in health education are frequently offered in the City of Boston through the Division of University Extension.

3. *Other State Departments.* Other departments of the State government, and particularly the Department of Labor and the Department of Mental Diseases contribute to health education.

B. Volunteer Agencies

1. *Massachusetts Medical Society.* The Public Education Committee of this organization carries on weekly radio broadcasting in coöperation with the Massachusetts State Department of Health.

2. *Massachusetts Society for Mental Hygiene.* This organization functions through the following activities: a, *Publications:* (1) "Monthly Bulletin," sent to members; (2) "Understanding the Child," a magazine for teachers, published quarterly; (3) "The Human Factor," for industrial groups and personnel workers; b, *Distribution of Literature;* c, *Conferences and Lecture Courses;* d, *Speakers' Bureau;* e, *Steering Service* (Advisory and non-clinical service to individuals through which they may be referred to habit clinics and psychiatric facilities); f, *Advisory Service to Other Groups;* g, *Boston Mental Hygiene Survey.* (This was published in February, 1931. The Report covered the problem of public health education as it concerns mental hygiene, as well as the problem of diagnostic and treatment facilities.)

3. *Massachusetts Society for Social Hygiene.* The educational activities of this organization center upon the topics of Parental Education and Sex Hygiene. They include the following: a, Lectures; b, Lending Library; c, Pamphlets; d, Consultation Service; e, Monthly Bulletin.

4. *Massachusetts Tuberculosis League.* The generalized education program for teaching the public how to prevent tuberculosis comprises the following: a, *Publications* ("Teaching Health to Children," mailed free each month during the school year to teachers and public health authorities, and "The Massachusetts Health Journal," issued quarterly); b, *Lending Library;* c, *Institutes and lecture courses;* d, *Lecture service;* e, *Consultant service to Schools and Local Groups;* f, *Pamphlets;* g, *Newspaper publicity;* h, *Early diagnosis campaigns;* i, *Research and school demonstrations;* j, *Parental education* (As a means of follow-up on the twenty-one summer health camps of the affiliated county and city health organizations, the League stimulates plans for parental education by conducting such activities as nutrition demonstrations, child hygiene and child guidance classes); k, *Educational work for foreign-born groups.*

C. Semi-Commercial Agencies

1. *New England Dairy and Food Council.* In general the educational activities may be classified as follows: a, *Lectures* by members of the staff (reaching 9000 people in Boston in 1930); b, *Moving pictures, film strips and lantern slides* (reaching 35,000 people in Boston in 1930); c, *Exhibits:* d, *Printed Matter,* including leaflets (936,500 distributed in 1930 in Boston), posters, plays, reports of researches, copy and suggestive material for health talks, recipe books, lists of balanced menus, and the "Dairy Council Digest," printed by the National Council, but distributed through branch offices; e, *Newspaper publicity.*

2. *John Hancock Life Insurance Company.* (Printed material and health films.)

3. *Life Extension Institute.* (Printed material.)

4. *Daily Press.* The "Boston Herald" and "Boston Post" run daily Health columns. The "Boston Chronicle" runs a weekly Health column and all newspapers print a considerable amount of health news and run special articles in the health field.

VI. RECOMMENDATIONS

A. General

It is desirable that the Health Education Committee of the Boston Health League should function as a Health Education Council and should meet periodically for the purpose of coördinating, fostering and promoting health education activities in the City of Boston. The membership of this Committee or Council should include at least the following: the Director of Health Education and one other executive from the Boston City Health Department, the Director of Health Education and one other executive from the Boston Public Schools, a representative from the Parochial School System, a representative from the Boston Council of Social Agencies, a representative from the Community Health Association, the Chairman of the Health Education Committee of the Boston Health League, the League's Secretary, and representatives of such other agencies as may be definitely engaged in health education activities in the City of Boston.

B. Boston City Health Department

The Health Education activities of all divisions of the Boston City Health Department should be inter-related under the direction of a

full-time health educator* who is especially trained in health education. The duties of such a person should be:

a. to coördinate and assist in the amplification of the work in health education and publicity which is now being done by each division separately,

b. to coöperate with the Child Hygiene Division and the Nursing Service in extending the present health education program in Health Units,

c. to arrange for publishing or securing from other sources pamphlets bulletins and other printed matter for distribution at Health Units, by nurses on home visits, and by inspectors attached to the Sanitary, Dairy, and Food Inspection Divisions,

d. to assemble literature on publicity methods, samples of printed materials which other organizations have found useful, and lists of sources of health moving pictures, film strips or other educational supplies,

e. to work with other health agencies in developing special demonstrations and educational programs of a city-wide character, to promote health and health activities, such as Child Health Day celebrations, exhibits, poster displays and publicity campaigns,

f. to foster a coöperative relationship whereby the Health Department may supply the Boston Public and Parochial Schools with data and demonstration materials which would be useful for health teaching and not otherwise readily available,

g. to develop news material which may be used by the press as a means of keeping the community informed concerning the significant activities of its health department and opportunities for health improvement, and

h. to coöperate with and supplement the other Health Department activities now being carried on in Parochial Schools.

2. The present health education program in Health Units should be strengthened by

a. arranging that the Director of Health Education shall advise and assist in the development of health habit training in solarium classes,

b. the provision of visual and other source material to be used by nurses for instruction in oral hygiene while children are waiting for dental clinics, and

c. the provision of additional visual and reading material for the benefit of patients waiting for other clinics and conferences.

3. The Monthly Bulletin should be resumed and made more useful by

a. including more information concerning the specific accomplishments of each division, and concerning the specific health problems confronting persons living in Boston, and

b. sending regular copies of the bulletin to Junior High School Teachers of community health.

*Between the time in which the above study was begun and the completion of the Survey, a Director of Health Education was appointed by the City Health Department.

C. Medical Institutions

1. It is suggested that clinics, out-patient departments and other divisions of Medical Institutions not now carrying out health education activities in an organized way should analyze their respective opportunities and develop health education along the general lines herein reported as successful in other similar institutions. Some of these devices are:

a. posters and exhibits on display in clinic waiting rooms,

b. distribution to patients of pamphlets and bulletins containing essential facts about disease prevention (all such material should be carefully prepared so as to convey a definite health lesson in language which the patient can understand), and

c. occasional use of moving pictures or lantern slides, either alone or accompanied by a lecture.

D. Boston Public Schools

The Boston School Department is to be commended for the development of a well-organized and efficient corps of health specialists and for the appointment of a Supervisor of Health Education. Definite progress is being made in health education.

The most important single need in health education in the Boston Public Schools is the development of a unified curriculum beginning with the first year of school life and based upon the principle of building each year's work upon the child's previous health program and upon the principle of carrying forward the health training and instruction of the pupil as rapidly as his age, interests, level of intelligence, and personal responsibility for his health behavior will permit.

The following specific recommendations suggest those steps which are believed to be of the greatest potential value in strengthening the health education program of the Boston School System:

1. A unified curriculum in health should be constructed for the whole school system. Such a curriculum could best be developed under the direction of a Central Committee made up of

selected specialists in Health and in Education from within the school system, and, if possible, with the consultant services of some one experienced in the development of health education curricula. It is desirable that an Assistant Superintendent serve as chairman of this committee. Such a curriculum should be developed according to approved methods, setting up a complete statement of objectives in habits, attitudes and knowledge and prescribing a program beginning with the kindergarten, progressing as rapidly as practicable, and extending through the Senior High School. The Central Committee should be assisted in the gradation of material by small committees of classroom teachers from each grade beginning with the kindergarten. The plan should provide a fresh approach at each grade level above the third. When new outlines for the first six grades are completed, it will doubtless be found desirable to revise, reorganize and expand the present Course of Study for Intermediate Schools and to develop a standard practice with reference to Health Education in Senior High Schools. (This study has not included an investigation of the adequacy of instruction in the various phases of health training such as physiology, sanitation, mental hygiene, social hygiene, and home nursing. The organization of such instruction is a problem to be considered in the construction of the curriculum here recommended.)

2. As soon as suitable provision can be made in the school department budget, the Supervisor of Health Education should be given two assistants in health education who would be assigned to work in the elementary schools.

3. The excellent library of health books which is being accumulated at the Administration Building should be further enlarged to include a more complete list of health textbooks for different grades, source books, and reference books.

4. A small unit library of health education material should be provided in each School District for teacher reference.

5. The city has made an excellent start in the use of motion pictures for health education. This activity is worthy of further development and extension.

6. Teachers in service should be given the opportunity for taking extension courses in health education subject matter and health education methods.

7. The splendid coöperative activities now under way for the Correction of Physical Defects should be further organized and extended in order that the correction of defects may be one of the objectives of the health program in every classroom, thus using the interests of teachers and children for its accomplishment.

8. Through classroom activities, particularly at times of epidemics, teachers and pupils are giving increasing attention to the problems of communicable disease control. This activity should be still further extended.

9. Inasmuch as the pupil's interest in his growth, as observed through periodic weighings, has been found to be one of the best motivating factors in the development of health behavior, it is recommended that the regular weighing of pupils by teachers (or in the upper grades by pupils themselves under teacher supervision) should be extended.

10. In some schools, classroom instruction could be improved through the more liberal provision for pupil use of classroom sets of one or more health textbooks for Grades IV to VI. Approved supplementary readers containing health subject matter should be more widely used as reading books for the first three grades.

11. In Intermediate Schools where there is a full-time teaching schedule in Hygiene, this instruction should be placed in the hands of one teacher. Steps in this direction are already being taken.

12. The teacher of Hygiene in Junior High Schools should be as well trained in teaching this subject as other teachers are for their respective specialties. Adequate training should include the following minimum essentials: (1) General and Organic Chemistry; (2) General Biology; (3) Vertebrate Anatomy; (4) Physiology; (5) Personal Hygiene; (6) Nutrition; (7) Elementary Bacteriology; (8) Municipal Sanitation.

13. The Board of Superintendents has recently authorized Health Education as a major subject of instruction under the High School Certificate. This should prove to be an important step in increasing the proficiency of health teaching in the Senior High Schools. A similar type of certificate should be developed for Junior High Schools.

14. A survey of the subject-matter training of Junior High School health teachers now in service should be undertaken from within the school system. Opportunity should be provided for supplementing the training of teachers who have an inadequate background and who wish to continue the teaching of this subject. Those who do not wish to teach Hygiene should be assigned to other subjects as rapidly as opportunity permits, and teachers with adequate preparation should be assigned to this task.

15. The school lunchrooms visited serve good food and are well-managed. They could be made to contribute more to the health education of pupils. Specific projects and procedures might be developed through a coöperating committee in each school, representing the administrative staff, the school lunch service, and the teacher of hygiene where one is present.

16. Commendation is due the Teachers' College of the City of Boston for the development of its well-organized course of health instruction for all freshman students and for the development of definite plans for teaching health

education methods in the fourth year. The maintenance of the best possible health education program is fundamentally important in the training of student teachers and it is urged that the courses in health education methods which are to be established in 1933 be intimately related to the program of practice teaching.

E. Parochial Schools

1. It is desirable that the Parochial Schools in the City of Boston should have available the services of a full-time Director of Health Education.

2. In the interest of the work which the Director of Health Education of the City of Boston Health Department is doing in the Health Units, it is highly desirable that she establish contact with the health program of the Parochial Schools in these districts, as such a relationship would materially aid and strengthen the excellent work now being done by the Health Department physicians and nurses in coöperation with the teachers in the Parochial Schools. It is recommended that, until such time as a full-time Director of Health Education is available, the Director of Health Education of the Boston Health Department should give an appreciable amount of her time to the promotion of the health program of the Parochial Schools and that she should assist in the development of the revised course of study in health education for use in the Parochial Schools which is now being prepared for publication.

F. Other Agencies

Specific recommendations are not made with reference to the work of other voluntary agencies mentioned in this report. The development and coördination of their future programs should be guided by the Health Education Council in accordance with the changing needs of the community.

ORGANIZED ARMY MEDICAL SERVICE SETS EXAMPLE FOR CIVILIAN WORLD, REPORT DISCLOSES

A striking illustration of how the cost of medical care can be drastically reduced by coördinating and integrating related branches of medical care is revealed in a study of the organized medical service which provides care for the army and civilian population at Fort Benning, Georgia, made public by the Committee on the Costs of Medical Care.

The Fort Benning medical service is of significance to the general population of the country, it is pointed out, because it operates in a manner applicable to civilian groups elsewhere.

The cost of a hospitalized illness, which has always been a large item in the expense of sickness, has been reduced at Fort Benning to one-tenth of the amount families in the highest income groups throughout the country usually expend, the report states, and it is forty per cent below what families in the lowest income groups usually are charged for such care.

This report of the "Organized Medical Service at Fort Benning, Georgia," by I. S. Falk, Ph.D., published by the University of Chicago Press, is the twenty-first study completed by the Committee on the Costs of Medical Care, which on November 29 of last year issued its Final Report with recommendations based on its five-year study of the problem of "providing adequate, scientific medical care to all the people, rich and poor, at a cost which can be reasonably met by them".

Fort Benning is an Army post where infantry officers receive postgraduate training in strategy and tactics. Nearly 8,000 persons—officers and enlisted men, their dependents and servants — were eligible to receive care under the post's organized medical service in 1930, the year studied.

The population as described by the author of the report may be classified roughly into two categories:

1. The Family Group—composed of the military heads of families and their dependents and servants. This group comprised nearly half (46 per cent) of the total population eligible to receive medical care, and, for the most part, was not unlike any normal civilian population.
2. The Army Personnel—composed of officers and enlisted men who live in bachelor quarters or barracks under a strictly military régime. This group comprised 54 per cent of the post's total population.

COMPLETE MEDICAL CARE PROVIDED

Practically every type of medical care ordinarily available to the population of large urban centers was provided by the Fort Benning medical service —including office and home treatment by doctors and nurses, bed care in the hospital, complete dental care, x-ray and laboratory services, treatment by specialists, and drugs, medicines and eyeglasses when necessary.

The administrative relations and use of the physical equipment were closely coördinated and integrated so that time wastes were minimized and overhead expenses reduced.

The per capita cost for the practically unlimited medical service at Fort Benning is computed by the author at $40.90 per year, but he believes that, if proper allowance were made for the special procedures required by Army administration which would not be necessary in a civilian population, this cost might be reduced to $35 or with less extensive hospitalization even to $30 per capita.

The study revealed that the average cost per maternity case cared for at the Fort Benning hospital totaled $129.24, whereas other studies of the Committee on the Costs of Medical Care have re-

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MEDICAL PROGRESS

PROGRESS IN TUBERCULOSIS, 1931-1932

BY JOHN B. HAWES, 2ND, M.D.,* AND MOSES J. STONE, M.D.*

B. C. G.

CONTROVERSY between Calmette and opponents of B. C. G. vaccination still rages, Beghans recently claiming that adherence to general hygienic measures will have the same effect on the tuberculosis and the general mortality of infants that B. C. G. vaccination has. In fact, W. Berghaus (*Deutche med. Wchnschr.* 57:93 (Jan. 16) 1931) claims that there is an increase in the general mortality in children in France since the onset of mass-vaccination in 1927 and that the protective effect of artificial immunization by vaccination is worthless as soon as the natural resistance lags or breaks down. All reports, however, at the Seventh International Congress of Tuberculosis emphasize the harmlessness of B. C. G. vaccination. Genuine proof can be obtained only if the control children live under the same conditions as the treated ones. The careful study of Park of New York, and his associates speaks highly in favor of the vaccination. The value of satisfactory control material cannot of course be overemphasized. The question of correct statistical data is still in the foreground in the discussion of this subject.

DIAGNOSIS

E. Wolff, R. S. Stone and F. Eberson, *Am. Rev. Tuberc.* 25:738 (June) 1932, in a study of a group of children suspected of being tuberculous, come to the conclusion that the symptoms and physical signs are not conclusive. A history of definite contact is of rather limited value, but some roentgenological findings are pathognomonic. They found that the grade of the tuberculin reaction is of definite value in this group and that it also appears to have a value in deciding the question of the activity of the lesion.

W. B. Wood, *Lancet,* 2:726 (Oct. 4) 1930 reviews the signs and symptoms of pulmonary tuberculosis. He found that physical signs may be absent over early infiltrations or even cavities, more than 50% of which are absolutely or relatively silent. When the x-ray is not available a diagnosis of tuberculosis is favored by certain findings always bearing in mind the tendency of the tuberculous to minimize symptoms (1) a history of close contact or of pleurisy with effusion (2) a febrile attack resembling influenza in a young person (3) cough with expectoration persisting for more than a week (4) lassitude and hemoptysis in a young person. The most significant physical sign in the early case is the hearing of crepitations below the clavicle, in the axilla and internal to the spine of the scapula.

J. A. Struthers, *Tubercle,* 12:1 (Oct.) 1930 made a study of 350 consecutive patients examined, as to the value of physical signs in the diagnosis of pulmonary tuberculosis. He emphasizes that a diagnosis based on symptoms alone, as lassitude, cough, dyspnea, and loss of appetite should not be made. Such signs as clubbing of the fingers, dilated vessels at the base of the neck, D'Espine's sign and Eustace Smith's sign are not pathognomonic of tuberculosis. He concludes that his experiences are entirely in accord with the five cardinal signs as given by Lawrason Brown.

W. B. Davidson, *New Eng. J. Med.* 203:860 (Oct. 30) 1930 stresses the importance of early x-ray examination in suspected tuberculosis. He emphasizes the point that the x-ray man is as much entitled to the history and laboratory findings as the clinician, and that one should not ask the roentgenologist to make a diagnosis for him, but only with him.

TREATMENT

L. Fisher, *Am. Rev. Tuberc.* 24:57 (July) 1931 studied the effects of posture on the diaphragm and mediastinum, especially following phrenicectomy. He found that diaphragmatic excursion is generally greater bilaterally in the recumbent posture, decreasing somewhat before the end of an hour; the heart and mediastinal contents also shift toward the dependent side, the average displacement being greater to the left than to the right. Studying the excursions following phrenicectomy, he found that there is a descent and increased excursion of the contralateral hemidiaphragm, which is accentuated and tends to persist in the lateral posture, after phrenicectomy. There was also greater displacement of the heart and mediastinum due to posture after phrenicectomy. He concludes that the lateral recumbent posture increases diaphragmatic breathing, a change favoring rest of upper lobe lesions. Thus, following phrenicectomy the scope of postural rest is widened, especially for patients with unilateral involvement or with only apical disease in the contralateral lung.

B. N. Carter, *Am. Rev. Tuberc.* 24:199 (Sept.) 1931 makes a plea for open pneumoly-

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sis instead of the Jacobeus method, i.e., closed or intrapleural cauterization. He advocates the open method in cases of wide bands, folds, and thick fleshy, round adhesions. In any case, save possibly those with thin string-like adhesions he prefers the open to the closed method. He feels that it is safer to deal with adhesions directly than to divide them through a thoracoscope where one has less control of the situation in case of hemorrhage.

L. Fisher, *Am. Rev. Tuberc.* 24:213 (Sept.) 1931 finds cauterization of adhesions a very important adjunct in the treatment of tuberculosis. Of the pneumothorax patients residing at Waverley Hills Sanatorium since July, 1930, 28.6% proved suitable for cauterization. According to this author the galvano-cautery affords a reasonable and safe method for adhesion cutting, and should be used more often as an adjunct to artificial pneumothorax.

L. S. T. Burrell, *Lancet,* 2:1109 (Nov. 22) 1930 attempts to answer when pulmonary tuberculosis should be treated. He feels that unnecessary treatment may readily make an invalid of an individual who is out of sorts through some other cause. In early suspected cases for which treatment is most important, the symptoms are cough, sputum, fever, night sweats, hemoptysis and pleurisy. Physical examination should be done, but undue faith should not be placed in physical signs. An x-ray is all important, but demands intelligent interpretation. He emphasizes that an idle life is not a healthful one and that many a patient will live longer if he thinks less of his own health and settles down to some suitable occupation.

J. A. Struthers, *Tubercle,* 12:62 (Nov.) 1930 writing on sanatorium treatment, emphasizes that the value of sanatorium treatment is not to be judged solely by the survival time of the patient. The prevention of the spread of infection, the patient's comfort, the lessening of the strain of nursing for relatives of the patient, and instruction in proper modes of living are likewise valuable advantages.

E. L. Sandiland, *Tubercle,* 12:49 (Nov.) 1930 describes the work of tuberculosis settlements. He is of the opinion that settlements should be extended from existing sanatoria, and the question of suitable markets and trades carefully studied. The sanatorium must be the controlling authority of the whole settlement because the scheme is primarily a medical one.

P. C. Varrier-Jones, *Brit. J. Tuberc.* 24:175 (Oct.) 1930 also discusses after-care in tuberculosis. He states that expensive propaganda designed to tell such patients how to live is a waste of money unless the sufferers are enabled to follow the advice given. Sanatoria are useless for the permanent arrest of the disease, except in early cases, unless coupled with village settlements. Employers will not hire consumptives so long as fit men are available. Availability of village settlements serves to remove the patient's fear of economic disaster and once removed earlier diagnosis would be made more frequently.

A. Frisch, *Wien. klin. Wchnschr.* 44:144 (Jan. 23) 1931 advises that collapse therapy should not be used on every early infiltration in the lungs, but as soon as cavitation occurs pneumothorax should be induced. Lesions in the contralateral lung are no longer considered as strict contraindications, as they used to be, especially since bilateral pneumothorax may be used to advantage. When during the reëxpansion of the collapsed lung, signs of mediastinal shifting occur, oleothorax or phrenicectomy is advised. If the induction of pneumothorax is impossible, phrenicectomy should be tried and should be complemented by thoracoplasty if necessary.

E. J. O'Brien, *Arch. Surg.* 21:1134 (Dec.) 1930 points out that there can only be two reasons for not immediately instituting some form of surgical collapse for unilateral lesions, one being that the lesion is so small that one is optimistic enough to believe it will get well on bed rest alone; the other that such a measure could not help. He remarks that it is a benign lesion indeed in which at least a crushing of the phrenic nerve should not be resorted to in order to give the patient the benefit of the additional rest afforded while the diaphragm is paralyzed. He also points out that successful collapse of the more affected lung often results in healing of the lesions in the contralateral lung.

H. Jessen, *Deutsche. med. Wchnschr.* 56:1003 (June 13) 1930 gives some indications for pulmonary collapse. Artificial pneumothorax is indicated in fresh cavities. Adhesions may be stretched during treatment or cut according to the Jacobeus method. Phrenicectomy acts by lessening pulmonary tension and may produce a favorable influence on any part of the lung. Extrapleural thoracoplasty is indicated in the lung with extensive disease, cavity and adhesions, but the patient must have a good cardiac reserve. Combination of pneumothorax and phrenicectomy is justified only at the end of pneumothorax treatment. It may prevent mediastinal shifting as a result of reëxpansion. It favors pulmonary contraction. Combination of pneumothorax and thoracoplasty is indicated in upper lobe processes with cavities, adhesions and incomplete pneumothorax. Phrenicectomy should be done preliminary to thoracoplasty. As a test operation for thoracoplasty, it is not reliable.

J. B. Amberson, Jr., B. T. McMahon and M. Pinner, *Am. Rev. Tuberc.* 24:401 (Oct.) 1931 give their results following a clinical trial of sanocrysin in pulmonary tuberculosis. They found no evidence in 12 cases studied according to such a plan, that sanocrysin given in small,

gradually increasing doses up to a total of 6.1 gm., has a beneficial effect on pulmonary tuberculosis or its complications. Compared with "control" cases, more of the sanocrysin-treated cases became worse. The evidence was suggestive that sanocrysin was at best partly responsible for the unfavorable trend of the disease in some of these cases. They conclude that because of the lack of definite evidence of benefit and because of positive evidence of harm which in some respects is long-lasting, especially in the kidneys, the use of sanocrysin is not justified.

B. L. Brock, *Am. Rev. Tuberc.* 24:436 (Oct.) 1931 in an article immediately following the previous one in the same journal comes to the very opposite conclusion that sanocrysin has a remarkable beneficial clinical effect upon exudative tuberculosis in the white race, although in the Negro race it has very little effect.

E. Rist, *Rev. de la tuberc.* 11:915 (Oct.) 1930 attempts to answer the perplexing problem of when to discontinue artificial pneumothorax. While this is still an open question he feels that security cannot be assured before the fifth year. When such incidents as pleurisy complicate the pneumothorax, it may sometimes be advisable to discontinue it sooner than in uncomplicated cases. He insists that all aspects of the problem must be studied, such as the general condition, working capacity, resistance to fatigue, and roentgenographic appearance of the lung. He also adds that some old pneumothorax cases are uselessly prolonged 8, 10 and 12 years. Here he feels that the inconveniences and disadvantages outweigh its advantages.

E. J. O'Brien, *J. A. M. A.* 95:650 (Aug. 30) 1930 reports his results following phrenic nerve operation on 500 patients. A comparison was made of the series surgically treated with a group of 100 as nearly similar cases as possible in whom only routine rest in bed was given. The mortality results bore witness to the value of the phrenic nerve operations. Results with phrenicectomy proved more effective in cases with moth-eaten cavities and in those with soft walls, especially the smaller ones. On the whole, he feels that phrenicectomy is not to be considered lightly, but his experience with it has been quite satisfactory, and he believes that a careful study of the results will be sufficient to warrant its more extensive use.

H. C. Ballon, H. M. Wilson, J. J. Singer and E. A. Graham, *Arch. Surg.* 21:1291 (Dec.) 1930 studied the occurrence of gastro-intestinal and cardiac symptoms following unilateral phrenicectomy. With one exception all gastro-intestinal and cardiac symptoms were only temporary. In one case, cardiospasm apparently followed phrenicectomy. No marked postoperative mechanical displacement or shift of the upper third of the intrathoracic portion of the esophagus was noted, but slight respiratory deflection of the lowermost intrathoracic portion occurred. The normal "milking action" of the diaphragm could still be observed following the operation. Ten patients had electrocardiograms before and after phrenicectomy and nine others after the operation only. No marked changes were observed.

G. B. Webb, *Ann. Int. Med.* 4:372 (Oct.) 1930 gives some of the results of compression therapy. In general, he claims that the results from artificial pneumothorax therapy are twice as good as without this treatment. The Jacobeus method of intrapleural pneumolysis has slightly increased the successful results of pneumothorax. As to phrenicectomy, he feels that it is still too early to evaluate its results. He quotes Alexander's statistical studies showing cures resulting in over 36% of patients on whom thoracoplasty was done. He concludes that whatever operative procedure is followed, patients must have from three to four years of skilled medical observation.

J. B. Amberson, Jr., *Ann. Int. Med.* 4:343 (Oct.) 1930 writes on the indications for and the results of artificial pneumothorax treatment in pulmonary tuberculosis. He gives the following indications: (1) extensive unilateral tuberculosis with extensive caseation and large single or multiple cavities; (2) acute unilateral pneumonic phthisis, as a type requiring prompt collapse, as caseation may occur rapidly and toxemia is severe; (3) more chronic unilateral disease with cavities 5 cm. or more in diameter in patients having good general resistance and a tendency to fibrosis; (4) hemorrhage cases, as he feels that almost all hemoptysis in tuberculosis comes from cavities and immediate collapse is usually indicated to prevent spread of the disease; (5) cases in which indications are less clear, which are best observed for a time to test their response to rest, and (6) certain cases of bilateral disease in which one lung is more diseased than the other. As to the results, he finds that it depends on whether cavities were closed. If the cavities were kept closed for from 18 months to two years, the patients did well, and where the cavities were not closed, patients did not do well.

A. T. Cooper, *Ann. Int. Med.* 4:1569 (June) 1931 reports on his eight years' experience with phrenicectomy in a series of 200 cases. He finds that the operation is relatively free from danger and that it benefits many patients. A tendency toward compression has been noted in 42% of cavities in the mid-lung or base, while only 30% of the cavities higher in the lung have been definitely improved. Gastro-intestinal disturbances following the operation occurred in 40% of the cases. They have, however, never seriously interfered with digestion and subsided in a few weeks. As to the indications for this operation, he gives the following: when pneumothorax is impracticable, or has been unsuccessfully tried in cases with a retrogressive le-

sion and the contralateral lung showing only minimal disease. It is indicated especially in lesions limited to the central or lower part of one lung. In most cases he used it in conjunction with pneumothorax or thoracoplasty.

J. C. Dundee, *Am. Rev. Tuberc.* 25:469 (Apr.) 1932 recommends phrenicectomy before one terminates treatment by artificial pneumothorax. This, he recommends especially in cases where pleural effusion complicated pneumothorax treatment or in cases of a flexible mediastinum. He condemns the practice of allowing moderate to large amounts of fluid to remain in the pleural cavity for prolonged periods, because such a procedure eventually tends to limit seriously the reëxpansion of the lung, as it usually increases pleural thickening, pulmonary fibrosis and atelectasis.

J. B. Hawes, 2nd, *Am. Rev. Tuberc.* 25:507 (Apr.) 1932 coins the phrase "danger period" during the interval of convalescence. He describes it as the time when patients are not ill enough or who are thought not to be ill enough to require medical supervision, and yet who for many months should not be allowed to go back to work. He makes a plea for medical supervision and medical guidance, long after active disease has ceased. He recommends an educational campaign in this direction along the lines of early diagnosis.

N. Oekonomopoulo, *Beitr. z. Klin. d. Tuberk.* 73:442, 1930 used phrenico-exeresis with success in 7 cases of isolated tuberculosis of the upper lobes. The results were especially favorable in cases with fresh processes affecting part of the lobe. If liquefaction is present, those being associated with thin-walled cavities give a better prognosis than old destructive foci surrounded with caseous pneumonic collapse, although pleural adhesions on the surface of the lobe may prevent the success of the procedure.

GERSON DIET TREATMENT

A. Herrmannsdorfer, *Wien. klin. Wchnschr.* 43:1397 (Nov. 13) 1930 modifies Gerson's diet by adding 80-90 gms. of meat per day, increases the amount of fat and reduces the carbohydrates. The daily intake with his diet consists of 90 gms. of protein, 160-200 gms. of fat and 220 gms. of carbohydrate. Fresh vegetables and raw fruits are given freely, and withdrawal of sodium chloride is maintained. The most spectacular results were observed in patients with lupus. In surgical tuberculosis, some good results were also observed. There is, however, disagreement as to its value in pulmonary tuberculosis. The essentials in the Gerson diet system are as follows: (1) The substitution of *Eugusal,* a halogen-free vegetable kitchen salt preparation for sodium chloride. (2) The free use of uncooked fruits and vegetable extracts, salads and fruit juices. (3) Marked restriction in the amount of meat. (4) The use of fresh uncooked milk, one pint or more daily, sour milk, eggs, oatmeal, whole meal bread, and farinaceous foods in restricted amounts. Spices are allowed. Mineralogen, a special blend of mineral salts of vegetable origin, and a phosphoric acid, cod-liver oil preparation are given three times daily. Gerson Sauerbruch and Herrmannsdorfer claim that valuable results are obtained in the treatment of lupus, tuberculosis of the bones and joints, and in the surgical treatment of pulmonary tuberculosis. Definite evidence of the value of the treatment in tuberculosis of the lungs has not been submitted thus far.

F. Spies, *Ztschr. f. Tuberk.* 55:317, 1930 found the Gerson diet to be of no value in the treatment of cases of pulmonary tuberculosis, and he considers it an expensive dietary measure which also does not appeal to the patients.

A. Moeller, *Deutsche med. Wchnschr.* 56:1396 (Aug. 15) 1930 concludes that the results of the salt poor diet are worse than would be expected on a general hygienic dietetic régimen. The diet did not influence temperature, cough, expectoration or night sweats. There was no effect on the blood picture or sedimentation rate.

R. Volk, *Wien. klin. Wchnschr.* 43:1461 (Nov. 27) 1930 reviews the extensive literature on this subject. The general conclusion is reached that Gerson's diet in the modification suggested by Herrmannsdorfer brings about striking improvement in tuberculosis of the skin, but that its influence on tuberculosis of internal organs and particularly of the lung is questionable.

CHILDHOOD TUBERCULOSIS

E. J. Opie, *J. A. M. A.* 95:1151 (Oct. 18) 1930 discusses at length the subject of tuberculous infection of school children. He feels that children with the following conditions are in danger of tuberculosis and should receive special care in open-air schools or preventoria. (1) Latent tuberculosis infiltration of the childhood type evident in roentgenograms often associated with tuberculosis of tracheobronchial lymph nodes, (a) tuberculosis of tracheobronchial lymph nodes with some calcification, recognizable by roentgenological examination—when the child is still in contact with open tuberculosis (b) when the tuberculin reaction is intense (c) when the lesions are unusually large, or very numerous; (3) latent tuberculosis of the adult type; (4) arrested pulmonary tuberculosis, notable in children who have been discharged from sanatoria; (5) an active tuberculin reaction or an otherwise negligible tuberculous lesion recognized by roentgenological examination in association with impaired health and conspicuous underweight. He recommends that sanatorium treatment or its equivalent should be given to those with tuberculous lesions accompanied by symptoms and physical signs referable to tuberculosis,

also those who show progressive lesions or where the tracheobronchial lymph nodes show no signs of undergoing calcification.

F. Eberson, J. P. Delprat and E. Wolff, *Am. J. Dis. Child,* 40:753 (Oct.) 1930 made a study of symptoms and signs in suspected juvenile tuberculosis. They feel that the commonly accepted clinical symptoms and signs have no diagnostic significance, except that they may be correlated with roentgenograms and the tuberculin test, when these are definitely positive for tuberculosis. Only roentgenograms in conjunction with tuberculin tests are of definite diagnostic value.

G. Jessel, *Tubercle,* 11:493 (Aug.) 1930 investigated the number of secondary cases occurring in families in spite of modern antituberculosis measures. He found that known cases of pulmonary tuberculosis give rise to at least 15% of secondary cases. Based upon these observations he offers the following suggestions: (1) The most profitable contact work is to be done among the families of patients with positive sputum, as these patients produce nearly all the secondary cases. (2) Relatively more attention should be paid to adult contacts who are not infrequently the source of infection, and (3) that wide dissemination of knowledge on health subjects, and growing familiarity of the public with medical examinations will facilitate examination of suitable contacts.

W. B. Wood, *Tubercle,* 11:489 (Aug.) 1930 discussing the same subject feels that the power to prevent the spread of tuberculosis depends upon the ability to answer three questions: (1) By whom was the patient infected? (2) Whom has he infected? (3) Whom may he infect? Meanwhile, he urges the use of every modern method of investigation which will help in the diagnosis of pulmonary tuberculosis in its early exudative stage, when collapse therapy can be used with fair prospect of success.

H. M. Turner, *Tubercle* 12:145 (Jan.) 1931 emphasizes the fact that house contacts of sputum-positive cases of tuberculosis suffer both an incidence rate and a death rate from tuberculosis very significantly greater at all ages than the corresponding rate for the general population. He urges the periodic examination of all contacts and that preventive treatment be instituted before the contact has reached the stage of being "notifiable" according to the generally accepted standards.

F. M. McPhedran, *Brit. M. J.* 1:342 (Feb. 28) 1931 in a report based on observations over two years finds that among a group of children whose fathers or mothers had positive sputum, about 9% showed clinical tuberculosis, about 2% well-defined latent pulmonary infiltrations, and about 20% calcification of the tracheo-bronchial lymph nodes. In these children the number of pulmonary lesions has increased during four years of subsequent observation. He adds that economically the greatest waste in the supervision of tuberculosis arises from the failure to institute prompt and proper treatment.

E. S. Hewitt, and R. E. Cutts, *Am. Rev. Tuberc.* 25:525 (Apr.) 1932 examined 1328 high school students for tuberculosis. Of this number 11.5% gave positive reactions to the Mantoux test. Of 34 students definitely known to have been exposed to open tuberculosis, 61.8% gave positive reactions to the tuberculin test. That its most serious menace is to those who live in homes where infection is present was shown by the much greater percentage of positive Mantoux tests among students from such homes as compared with the lower percentage of positive tests found in the group as a whole.

D. J. Dow and W. E. Lloyd, *Brit. M. J.* Aug. 2:183 (Aug. 1) 1931 in an analysis of 1220 children found that the incidence of tuberculous infection is doubled when there is contact with open tuberculosis, and is slightly higher in children of tuberculous fathers with positive sputum than in children of tuberculous mothers with positive sputum.

O. Satke, *Wien. klin. Wchnschr.* 43:1348 (Oct. 30) 1930 discusses the question of constitutional disposition to tuberculosis. He believes that a non-specific congenital resistance of the body against tuberculosis is probably more important than a specific immunization which is acquired with a childhood infection. He also feels that the individual with the true asthenic habitus characterized by underdevelopment of musculature, poor development of fatty tissue and a heart which is too small in proportion to the lung is probably more susceptible to tuberculosis than are those with the arthritic habitus.

PNEUMONOCONIOSIS

H. Brednow, *Klin. Wchnschr.* 9:1363 (July 19) 1930, describes three stages of pneumonoconiosis. In the first stage the roentgenogram shows disseminated small foci usually sharply defined. They are localized chiefly in the midfield of both lungs, and the apices are typically free. The hilum usually shows accentuation of the normal markings. In the second stage the disseminated forms are larger, the hilar shadows become more massive, and the diaphragm is frequently tented. In the third stage the individual shadows tend to coalesce, and evidence of emphysema and diaphragmatic adhesions are regularly present. He states that small multiple cavities may be seen which are not necessarily tuberculous.

W. E. Cooke, *Brit. M. J.* 2:816 (Nov. 15) 1930, reports a case of a man who died with a clinical diagnosis of advanced silicosis. He had been a riveter in a boiler works for eleven years and a boiler cleaner, which included flue-cleaning, for nine years. Postmortem examination revealed pneumonoconiosis and tuberculo-

sis. Clinical analysis of the dried material from the lungs, boiler scale and flue dust, revealed identical substances in all, including siliceous matter, ferric oxide, aluminum, phosphorous calcium and magnesium.

International Silicosis Conference at Johannesburg, *Brit. M. J.* 2:567 (Oct. 4) 1930, considered various phases of the problem. Pathologically they recognized five stages of the disease. First, there is a fine bronchiolitis with an accumulation of dust-filled phagocytes in the terminal bronchioles. Secondly, there is an accumulation of dust-containing phagocytes about and in the intrapulmonary lymphoid tissue and then transportation through the lymphatics into the tracheobronchial lymph nodes. Thirdly, there is a gradual development of fibrous tissue within the mass of phagocytes and the formation of a characteristic nodule of hyaline fibrous tissue. Fourthly, degenerative changes occur in these foci. Fifthly, the hyaline nodules increase in size by extension at their periphery and coalescence of adjacent nodules takes place and brings about involvement of extensive areas of the lung. Clinically they recognize three stages. Pulmonary tuberculosis may be found in any of the stages. Rehabilitation schemes, such as farm settlements have so far proved unsuccessful.

Report of the Miner's Phthisis Bureau, *Brit. M. J.* 1:28 (Jan. 3) 1931. The South African Institute for medical research has made extensive studies of individuals suffering from silicosis. They observe that tuberculosis is the chief danger to be feared in dusty occupations, but the physical condition of the individual must be considered. Uncomplicated silicosis may undergo prolonged arrest for long periods, but many cases tend to progress from the earliest detectable state to a much more advanced fibrosis. They found that 75% of deaths which occur in silicotic miners are due directly to active tuberculosis. There exists in many, in fact most of the cases of clinically "simple silicosis" from the earliest stages, a latent element of low-grade tuberculous infection, and the presence of such latent foci may be regarded as a partial explanation of the tendency manifest in so many cases of simple silicosis for the ultimate development of active tuberculosis.

K. M. Lynch and W. A. Smith, *J. A. M. A.* 95:659 (Aug. 30) 1930 examined the concentrated sediment of sputum of asbestos workers and in three cases out of four found "asbestos bodies". They describe these bodies as of variable size, but consisting of a central filament of transparent-greenish-tinged needle-like crystal on which is deposited, in varying quantity, nodules, blobs and segments of a hemogeneous refractive substance, varying in color from light yellow to mahogany brown. They do not take the ordinary tissue and sputum dyes. They may be stained on the slide by the Prussian-blue reaction for iron, the heavier deposits taking an indigo-blue color indicating a considerable iron content. They suggest that the iron content of the deposits on the asbestos crystals is of tissue origin probably from the blood.

E. R. A. Merewether, *J. Indust. Hyg.* 12:198 (May) 1930, 12:239 (June) 1930, investigated 363 asbestos workers employed from one to 23 years. The most commonly encountered symptoms and signs are cough, cyanosis, dyspnea, expectoration and pain. Yet he found that advanced stages of asbestosis may be present with but slight symptoms. In early stages the films are unlike those of silicosis and present a slight "lack of translucency" called "veiling" or a ground glass appearance. Later there is more mottling, but the lesions are not so dense as are silicotic lesions and the classification into stages is not easy. The essential lesion is a chronic interstitial pulmonary fibrosis with thickened alveolar walls and the so-called "asbestos bodies"; golden yellow bodies found in alveoli and in their walls. He feels that the relationship of asbestosis to tuberculosis needs further investigation.

K. Husten, *Klin. Wchnschr.* 10:506 (Mar. 14) 1931 reports his observations on 240 autopsies on miners of the Ruhr district. In 205 cases nodular silicosis was present in the majority of the cases, combined with tuberculosis. In regard to the combination of silicosis and tuberculosis he distinguishes two different types. In one type the tuberculous foci seem to be superimposed on the silicotic lesions. In the other type the two tissue changes appear to be combined in one and the same focus. He found in all advanced cases of silicosis that the right heart was hypertrophied, the pulmonary artery showed dilatation and frequently focal sclerosis, and the lung showed massive emphysema. He feels that in the most advanced cases the cause of death was circulatory failure. In the total number of cases, however, pulmonary tuberculosis was a much more frequent cause of death.

H. E. Seiler, and M. D. Gilmour, *Brit. M. J.* 1:1112 (June 27) 1931 describe the autopsy findings in a man who suffered from asbestosis. They found that death was due solely to cardiac failure, secondary to back pressure resulting from the massive generalized fibrosis. Asbestosis bodies were abundantly present in all areas of both lungs. The bodies were generally golden-yellow in color and of great variety of shape and size. Many showed a core, thought to be asbestos fibre, running down the centre of the body. The deposit gave the Prussian-blue reaction for iron. Much of the finer dust was found within the endothelial cells of blood-vessels and in the peribronchial lymph nodes. A large amount of black carbon was present throughout the tissues.

S. R. Gloyne, *Tubercle*, 12:399 (June) 1931, studying the asbestos bodies finds that they are

nearly always present in the pulmonary fibrosis associated with asbestos workers, and in no other condition. The asbestosis body is apparently formed from the original fibre by a process of deposition of some material around the fibre so as to thicken it. The body stains black when brought into contact with ammonium sulphide, the group reaction for iron, and this color is lost when hydrochloric acid is added.

S. R. Gloyne, *Tubercle,* 12:158 (Jan.) 1931, found asbestosis bodies in the sputum and also in the feces of patients suffering from asbestosis.

W. Mascher, *Beitr. z. Klin. d. Tuberk.* 73:388, 1930, examined 32 workers in the quartz industry, the workers being subjected to an intense concentration of dust containing 99% of silicic acid. Roentgenologically 11 of the workers revealed silicosis in stage one, three in stage two, and seven in stage three, while six were free from silicosis and five were questionable. He found that workers with deformities of the thorax or the spinal column showed a severe silicosis after a relatively short time. Of 12 cases in which there were found roentgenologically old and fresh tuberculous foci, there could be noted no influence of the silicosis or of the tuberculosis upon each other.

LABORATORY STUDIES

A. Boquet, *Am. Rev. Tuberc.* 24:764 (Dec.) 1931 refutes very strongly the statements made by K. T. Sasano and E. M. Medlar to the effect that B. C. G. is not a "virus fixe" and that its stability depends entirely upon its environment. He feels that the irrefutable proof of such transformation, be it partial or total, sudden or gradual, has not been produced up to date. He concludes that Sasano and Medlar have been the victims of an experimental error and that their conclusions were premature.

E. Friedman, W. Dameshek and J. B. Hawes, 2nd, *Am. Rev. Tuberc.* 25:24 (Jan.) 1932, attempted to determine whether a careful examination of the blood in contact children would reveal any changes which could be correlated with clinical and roentgenological observations. Each child was given a subcutaneous injection of 0.01 mgm. old tuberculin, and blood counts and sedimentation tests were done before and after the injections. They conclude that study of the peripheral blood and of the sedimentation rate in suspected cases of hilum lymph-node tuberculosis is of great interest and may prove to be of some practical importance especially when correlated with a careful history and with physical and roentgenological examination.

W. A. Reilly, *Am. Rev. Tuberc.* 25:178 (Feb.) 1932 confirms the findings of other investigators that in active tuberculosis the monocytes increase in number and the lymphocytes decrease, while the reverse holds true when inactivity sets in. He adds, however, that the method is somewhat tedious and time consuming, and not practical except for a large number of patients.

H. Vos, *Ztschr. f. Tuberk.* 55:431, 1930, studying the relative value of red-cell sedimentation and leucocytes in prognosis of tuberculosis concludes that the leucocytes are more rapidly influenced by the immunobiological state than the sedimentation test.

E. S. Mariette and E. P. K. Fenger, *Am. Rev. Tuberc.* 25:357 (Mar.) 1932, give the results of their experiments using a new substance called M A 100 as a skin test for tuberculosis. They find that the M A 100 human protein is as sensitive and as selective as old tuberculin and probably more so. As the M A 100 protein represents a substance in a purified form which can always be reproduced at the same isoelectric point and which can be weighed out in milligram doses, so that the exact milligram content of the solution is known; it is a better testing substance than old tuberculin.

A. L. Banyai and S. V. Anderson, *Arch. Int. Med.* 46:787 (Nov.) 1930, made a study of the sedimentation test in 2000 patients. They found that the test gives valuable information concerning the activity of the disease, the amount of tissue destruction and the toxicity of the process. Retarding of the sedimentation speed in a patient in whom it was originally very rapid may be interpreted as a sign of improvement and vice versa. They advocate its use as a valuable aid in connection with the physical examination for determining the patient's working capacity before discharge from the sanatorium and at each examination at the dispensary.

H. I. Spector and R. O. Muether, *Am. Rev. Tuberc.* 25:533 (Apr.) 1932 observed that the more severe the infection, the greater is the sinking velocity of the erythrocytes. As the disease retrogresses the corrected sedimentation index gradually returns to normal. Hence, sedimentation tests are not only of value diagnostically, but also prognostically. They feel that this test, in connection with the leucocyte counts, is a superior indicator of pathology and possibly clinical activity to some of our heretofore-used methods.

C. H. Smith, *Am. J. M. Sc.* 182:221 (Aug.) 1931 finds that the blood-picture of a tuberculous infant or child may be correlated with activity of the pathological lesion in the tissues and organs. The complete picture of activity in tuberculosis of infancy and childhood as manifested by the peripheral blood comprises the following: An increased white-cell count, an elevation of polymorphonuclear neutrophiles and monocytes, a drop in the number of eosinophiles and lymphocytes, and a rising monocytic to lymphocytic ratio. A reversion to a more normal blood-picture is found in the stages of resistance and healing.

HELIOTHERAPY

C. K. Petter, *Ann. Int. Med.* 4:1452 (May) 1931 gives the following indications for heliotherapy: (1) all extrapulmonary tuberculosis, reactions being avoided if a pulmonary lesion is present; (2) all childhood types of tracheobronchial tuberculosis; and (3) those adult cases of adult type of pulmonary tuberculosis which in spite of other treatment remain stationary or lose ground. He strongly advises against its use in exudative types of pulmonary tuberculosis.

J. Sorgo, *Brit. J. Actinotherapy* 5:149 (Oct.) 1930, discussing this subject adds that only the apyretic, clinically inactive, cirrhotic cases or those inclining to cirrhosis should be treated by heliotherapy. Unstable cases which react to exercise, psychic influence, etc., are to be excluded. In general he feels that the results obtained are good.

B. L. Wyatt, *Ann. Int. Med.* 4:376 (Oct.) 1930 studied 200 cases of pulmonary tuberculosis who received heliotherapy in Southern Arizona. He is of the opinion that the number of patients showing appreciable improvement that might be attributed solely to direct heliotherapy was negligible. Results, however, derived from direct heliotherapy in pleural tuberculosis and tracheobronchial lymph-node disease were gratifying, and it appeared that this treatment was of value in preventing the development of intrapulmonary lesions in hilum tuberculosis and primary pleural involvement.

G. L. Cox, *Brit. J. Actinotherapy* 5:143 (Oct.) 1930 reports very satisfactory results in cases of tuberculosis of the skin and of tuberculosis adenitis.

MISCELLANEOUS

S. V. Pearson, *J. State Med.* 38:383 (July) 1930 makes a plea for training of the general practitioner in the subject of tuberculosis. He suggests that students be transported to tuberculosis sanatoria for a part of their training. The physician must also interest himself in the preventive side of the subject. He suggests allowing the general physician to do part-time health work and thus come in more frequent contact with this disease.

L. R. Williams and A. M. Hill, *New Eng. J. Med.* 203:1129 (Dec. 4) 1930 discuss again the old question of telling the tuberculous patient the truth as to the diagnosis. Based on a study of 1499 sanatorium patients they conclude that physicians have few grounds upon which to base their reluctance to tell the patients they are tuberculous. Many more patients changed their physicians before the diagnosis was established than afterward. Many patients were less worried and discouraged after learning the actual truth. They feel that only in rare instances is it inadvisable for the physician to take them into his confidence.

J. P. Palmer and R. B. Taft, *J. A. M. A.* 96:653 (Feb. 28) 1931, report five cases of spontaneous pneumothorax in which no pathological change of the lung was demonstrable. They give various theories as to the cause of so-called idiopathic pneumothorax. Some state that these cases are probably due to a tuberculous infection in which there are no physical signs and no positive roentgen evidence. The theory has also been advanced that a tuberculous process is present and causes the rupture, and that the collapse and rest of the lung allow this process to heal entirely without leaving any scar formation. Others think the condition due to rupture of an emphysematous bleb on the margin of the lung. Still others think that probably there has been some inflammatory condition causing adhesions between the visceral and parietal pleurae and that unusual exertion causes this adhesion to be torn loose, thus causing a rupture. Idiopathic pneumothorax often occurs while the patient is at rest or even asleep. They state that recurrence of the pneumothorax is not uncommon, and report one case in which there were eleven recurrences and in another eighteen recurrences during a period of eight years.

J. R. Beal, *Brit. J. Tuberc.* 25:21 (Jan.) 1931 reports six cases of asymptomatic spontaneous pneumothorax. The lesion in each was discovered in the course of a routine examination of patients known to be suffering from pulmonary tuberculosis. In none of these cases did he elicit a history of pain in the chest, or dyspnea, the patients being unaware that anything untoward had happened. He feels that latent pneumothorax is more common than is usually supposed.

B. Gordon and Tai, E. S., *Am. Rev. Tuberc.* 24:673 (Dec.) 1931 attempted to determine the type and quantity of food consumed by individuals before and after the onset of pulmonary disease. They noted that a sharp decline in the caloric intake precedes by one to two years the onset of demonstrable pulmonary tuberculosis. They feel that induced overnutrition is helpful in enabling the individual to "carry" infection with less untoward effect than would be the case in malnutrition. They are of the opinion that a prolonged deficiency of accessory food substances may be a factor in the occurrence of acute respiratory infections and manifestations and is one of the causes of failure to gain in weight. So far they have no definite data indicating that the dietaries used in their study influenced specifically the healing of tuberculous lesions.

H. Sewall, *Am. Rev. Tuberc.* 25:1 (Jan.) 1932 makes a plea for the understanding of the patient's mental processes by the physician. He feels that "the psyche of the patient is as wax

in the hands of the affectionate and intelligent physician," and that what military men call "morale" is of fundamental importance in the warfare in which our patients are engaged. He advises "humanism" and a realm of identical interests between doctor and patient.

J. A. Struthers, *Tubercle* 12: 99 (Dec.) 1930 made a detailed survey of the cases in which pulmonary tuberculosis existed in both husband and wife, and of those among widowed patients whose husbands or wives suffered similarly. He failed to produce any evidence of unduly high infection of husband by wife or vice versa.

A. T. Laird and R. M. Mayne, *Am. Rev. Tuberc.* 25: 512 (Apr.) 1932 feel that the practicability of caring for tuberculous patients in general hospitals is no longer a theoretical proposition, but has been proved feasible in many localities. They feel that sanatoria cannot now treat their patients properly without general hospital facilities. They recommend that all sanatoria become affiliated with class A hospitals, and conclude that the benefits to be derived by physicians, nurses, and the community in general, by the admission of tuberculous patients to properly conducted hospitals are many and demonstrable.

E. W. Hayes, *Ann. Int. Med.* 4: 1183 (Mar.) 1931 emphasizes the physician's rôle in keeping up the morale of the patient. He feels that it is easier to take the cure consistently among those who will give their moral support and sympathy and under the care of those who understand and appreciate the nervous and mental disturbances incident to the disease. The physician's ability properly to advise, intelligently to guide, and efficiently to manage his patient is the outstanding influence in bringing about a favorable outcome in pulmonary tuberculosis.

H. W. Hetherington, F. M. McPhedran, H. R. M. Landis, and E. J. Opie, *Arch. Int. Med.* 48: 734 (Nov.) 1931 investigated the question of tuberculosis in medical students. They found that the incidence increases rapidly from year to year being 11.6% in second year students and 20.5% in fourth year students. The frequency of advanced lesions increased at the same time. They feel that the high incidence of apical lesions in the medical students, increasing rapidly from the ages of 21 to 26, indicates that they were peculiarly subject to tuberculous infection.

A. R. Masten, *Am. Rev. Tuberc.* 25: 42 (Jan.) 1932 studying hemoptysis as a complication of pulmonary tuberculosis comes to a conclusion that while it is rarely immediately fatal, it is a most serious symptom and greatly diminishes the patient's chances of recovery.

ORGANIZED ARMY MEDICAL SERVICE SETS EXAMPLE FOR CIVILIAN WORLD, REPORT DISCLOSES

(Concluded from Page 140)

vealed that representative families whose total medical costs are similar to those at Fort Benning spend on the average $246.17 per hospitalized maternity case.

The average illness requiring hospital care was found to cost $48.06 per case at Fort Benning, or $4.73 per day, including physicians' and surgeons' services. This compares favorably, the report points out, with an average cost of $67.38 among "representative families" whose incomes are less than $1,200 a year and with $468.62 for families whose annual incomes are $10,000 or more.

During the year studied, $0.72 per capita was spent at Fort Benning for drugs and medicines as compared with an expenditure by "representative families" of $4.86 per capita, or seven times as much.

GREATER VOLUME OF SERVICES

In addition to the fact that the costs of the organized medical services at Fort Benning were lower than costs among comparable civilian groups elsewhere, the volume of services received was in general far in excess of that obtained by similar families on a conventional fee-for-service basis, according to the report.

The Fort Benning families received three times as many home and office calls per capita as did comparative "representative families," and were admitted to the hospital five times as frequently, it was disclosed.

Preventive services were so much more numerous at Fort Benning than elsewhere that the author stated it would be absurd to tabulate comparative data.

NUMEROUS ADVANTAGES

At Fort Benning, the report states, the personal relation between physician and patient is maintained; professional judgment, not cost, determines the amount of service which patients shall receive; the size of the medical staff can be adjusted to the needs of the population; the physicians, dentists, nurses, and others receive stimulation and encouragement from close professional contacts.

In conclusion, the author states that the study has indicated that this medical service, as operated under military auspices, may well serve as a pattern for a similar organization in civilian communities, where a coördinated agency of this kind is otherwise feasible and desirable.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 19031

ONE DAY'S COMA FOLLOWING HEADACHE AND VOMITING

MEDICAL DEPARTMENT

An American salesman forty-eight years old entered in stupor. The following history was given by his physician, who obtained it from the patient's fiancée and his sister. The chief complaints were pain in the back of the head and back and vomiting.

For three months he had complained of stiffness and pain in the left hip, pain in the kidney region and discomfort in the left lower abdomen after eating. At times he had seemed clumsy in getting about, though he had never fallen. He had difficulty in picking up cards from the table with his right hand. A month before entry he complained of headache in the back of his head and said that when he lay on his back things would often go black. Three weeks before entry he complained of fatigability and impairment of vision. Extraction of six upper teeth did not relieve the pain in his back and occiput. Only one tooth showed trouble. For a week before entry to a private hospital he was unable to work and for five days had been in bed, complaining of severe pain in the head and the lower back. Two days before entry he vomited four or five times and complained of dizziness. The day before entry he was very nauseated, vomited once, refused all food and in the afternoon was irrational at times. He had a restless night and in the morning could hardly be aroused. In the past few weeks he had lost 17 pounds.

Five years before entry he had two pulmonary hemorrhages within a short time. A physician examined his chest and told him he had an old healed process in his lung. Two or three other physicians had examined him and told him that his lungs were normal. He seemed to have no cough. Except that he had always had a low blood pressure his past history was negative so far as the informants knew.

On physical examination at the private hospital the patient was fairly well nourished. He was stuporous and could not be aroused to coöperate or answer questions intelligently. The temperature was 101° by rectum, the pulse 60, the respiration 24. There was bilateral exophthalmos and external strabismus on the left. Both disks were rather indistinct. Where the borders could be made out they were distinctly blurred, more on the left, where the blood vessels seemed engorged. The pupils were dilated and regular. The left was about one-third larger than the right. Neither reacted well to light. At times he seemed to have a nystagmus. His answers were unreliable, but his hearing seemed to be impaired on the right. The chest expansion was small. There was slightly diminished resonance over the upper half of the right chest, more marked in the back than in front. If he did not breathe deeply the breath sounds were very difficult to hear. No râles were made out. The heart and pulses were normal. The blood pressure was 125/88. The abdomen, genitals and extremities were normal. The neck was moderately stiff and could be bent only 45°. The biceps, triceps, abdominal and cremasteric reflexes were present. There was bilateral Kernig.

A spinal puncture at entry to the private hospital showed deep yellow fluid under an initial pressure of 350, jugular pressure 600 on the right, 550 on the left. Ten cubic centimeters of fluid was removed. It showed a cell count of 9, 7 lymphocytes, 2 polynuclears. There was no increase in globulin and the reduction of sugar was normal. After the withdrawal of this fluid the pressure was 170. On catherization 14 ounces of urine was obtained which showed a gravity of 1.025. Except for a slight trace of albumin the urine was normal. Blood examination showed the hemoglobin 80 per cent, the reds 4,630,000, 9,200 leukocytes, 84 per cent polynuclears.

As he was dehydrated an attempt was made to give him glucose by rectum, but this was expelled. He was then given 1000 cubic centimeters of glucose subpectorally. He was quiet during most of the night. He voided urine twice involuntarily. In the morning the pupils were more dilated and the condition of the fundi more marked. The left disk showed more change than the right, although the disk was not definitely choked. Another spinal puncture gave fluid of a lighter yellow under pressure of 125.

He was sent at once to the Massachusetts General Hospital.

A neurological consultant found that the patient appeared to be in deep stupor most of the time, but roused occasionally for short periods sufficiently to name simple objects and to point to the examiner's hand during a rough test of the visual fields. He muttered unintelligibly several times. When asked about venereal disease he replied that he had a Neisser infection two years ago. He denied chancre. He reached for an object held on either side. Both disk margins were indistinct on the nasal

side and a little blurred on the temporal side. There was no measurable swelling and no hemorrhages were observed. The pupils were equal and of average size or a little larger, very slightly irregular and reacted little if at all to light. There were occasional spontaneous nystagmoid movements of the eyes. At times both eyes were deviated to the left and held there momentarily. There was possible left external strabismus. When the patient talked or when pressure was applied over the orbits the right side of the face moved much less than the left. The right arm and leg appeared to be a little weaker than the left. The right leg was held everted and firmly flexed at the hip. Either leg was moved slightly in response to painful stimuli. The biceps, knee jerks and ankle jerks and supinators were equal. The right plantar was normal, the left questionable.

A Hinton test was negative. A lumbar puncture in the third interspace the day after entry showed an initial pressure of 250, after withdrawal of 10 cubic centimeters of fluid 110. The sugar was 89, the chlorides 755. There were 16 cells, 5 polynuclears, 4 lymphocytes, 7 red cells.

The temperature was 97.8° to 100°, the pulse 58 to 120, the respiration 24 to 29.

X-ray examination showed the left diaphragm abnormally high. The lung fields showed no definite variation from normal. The mediastinum was definitely abnormal. The trachea and heart were slightly displaced to the right, but there was also rotation of the patient on the film. Situated over the region of the left hilus there was an 8 centimeter shadow which extended up to the level of the clavicle and out to the midaxillary line and appeared to compress the trachea slightly on its left lateral wall. There was no definite variation from the normal in any of the visualized bones of the chest and no calcification in the region of the kidneys. Examination of the skull was negative.

Three days after entry a nodule on the skin of the scalp was removed under local anesthesia for biopsy.

The patient remained stuporous and continued to have intermittent vomiting, though his general condition improved. A course of deep x-ray therapy was begun a week after admission. As he could retain nothing on his stomach at first, intravenous glucose was given daily. He complained of severe pain in the head at times. After five weeks there were days when he had little pain, retained his food, felt quite well and sat up in a chair. On other days he had short periods of severe pain in the head usually accompanied by vomiting and increase in blood pressure. A week after the course of x-ray therapy was completed he sank rapidly. His chart continued practically flat. Fifty-two days after entry he died.

Clinical Discussion

Dr. Richard C. Cabot: A few years ago there was a pretty careful putting together in Chicago of cases seen first in coma, with relation to the percentage of right diagnoses. It was found that there was a very much smaller percentage of right diagnoses in these than in other cases, the reason being, I think, primarily the one suggested here, that the history comes to us indirectly and therefore has more chance of being defective or wrong. We pride ourselves on judging from objective evidence, physical examination. But I think any of us would agree that if we had to choose between the history and the physical examination, in most cases we would rather have the history. The fact that we go wrong in so many cases when we can make a physical examination but cannot obtain a good history shows, I think, the importance of the history.

We think first of organic brain disease in a case beginning with so much headache, with vomiting, with fever, with irrationality, apparently with some difficulty in muscular power of the right hand and with clumsiness in muscular movements. Those signs make us think first of brain disease and secondly of cord disease,—not so much of that because of the headache.

"A physician examined his chest and told him he had an old healed process," but did not mention in what organ it was. I suppose it was in his lungs and not in his heart. An old healed process in his heart might account for the hemorrhage (through pulmonary infarct) in case he had failing compensation. But I take it they are talking about his lungs.

I do not know whether it is perfectly familiar to you that most patients examined with the stethoscope immediately after a large pulmonary hemorrhage show nothing. I do not know what is seen by x-ray. I remember being very much surprised in early days when I examined patients just after a pulmonary hemorrhage, expecting to find something. That is partly because, of course, we have not the right to make them cough much or even make them breathe very deeply, because we are afraid of starting up the hemorrhage. Under those conditions we generally do not hear a thing.

"He seemed to have no cough." Again, that does not necessarily exclude pulmonary tuberculosis.

Coming to the physical examination, with that history the thing that naturally comes to our minds first is tuberculous meningitis or a solitary tubercle (tuberculoma), and some other brain tumor next.

His pulse was 60, which for that temperature was notably slow. Very seldom we see a pulse as low as 60 with a temperature of 101° except in brain disease.

The exophthalmos is unexpected to me. The strabismus we expect of course. My experience is that a nystagmus that we are not sure about does not help us in diagnosis. It is only a nystagmus that is perfectly obvious and clear that is useful.

We have the two signs on which we rely most for a diagnosis of meningitis, until we come to the spinal fluid,—the stiff neck and the Kernig. So far everything looks like tuberculous meningitis.

The cell count in the lumbar fluid is distinctly surprising. I entirely expected a higher count. I do not know why there are so few cells.

Albumin, in a condition like this, would be almost invariably present in the urine.

Everything then, so far, except the possibility at the top of the right lung, still points towards brain disease, and especially towards spinal meningitis; but our enthusiasm for the diagnosis is dashed when we find only nine cells in the spinal fluid and only seven lymphocytes, but we are not going to be balked by that one thing if everything else comes right.

I take it that his pupils did react to accommodation, which is suspicious in relation to a possible cerebrospinal syphilis; but that like tuberculosis ought to give us more lymphocytes in the fluid.

The second lumbar puncture gave still nine white cells, exactly the same number of cells they had before.

"The mediastinum was definitely abnormal." That is quite unexpected. I had not been thinking at all of the mediastinum.

"There was no definite variation from the normal in any of the visualized bones of the chest and no calcification in the region of the kidneys." That is in relation to tuberculosis, which sometimes shows renal calcification from an old tuberculous process. The other possibility is metastasis in connection with this mass shown in the mediastinum.

X-ray therapy was begun on the principle that the tumor might be lymphoma and so this treatment might do him some good.

I take it he met his death from metastatic malignant disease in the brain, though I started, as I think anybody should have, very strongly biased towards meningitis on account of the history of pulmonary hemorrhages, a supposed healed pulmonary lesion, a stiff neck and Kernig sign without localizing or focal symptoms, although he was a little weaker on one side of the body than the other. Then we ran up against this practically normal spinal fluid, which as I said was altogether atypical for meningitis. Surely but for the x-ray I should have continued to be off the track. I think this is a good thing to remember. When a patient comes in with cerebral symptoms we often do not think of the danger of metastasis there from some perfectly silent lesion. I am sorry that we have not the x-ray. Did you see the film, Dr. Mixter? Was it an obvious lesion in the chest?

DR. W. JASON MIXTER: Yes. There may have been a secondary shadow, but the main shadow was a single large mass.

DR. CABOT: In view of what Dr. Mixter says I do not see how we can make any other diagnosis than brain metastasis from mediastinal tumor.

Besides the mediastinal mass was there a tumor elsewhere in the body,—a hypernephroma for example? The diaphragm is high on the left. Is it possible there is a left hypernephroma? We have done all we can in mentioning it. If we had a pyelogram it might have helped us. It seems to me, however, much more likely that the mediastinal growth is the primary growth. Is it possible that the hemorrhages in the lungs four years before had anything to do with these metastases in the chest? I think not. I do not think any form of malignant disease could be there four years and not be bigger than it is now. Supposing it was cancer of the bronchus or cancer of the lung; it might give hemorrhages, but ordinarily it would not stop giving hemorrhages and it would not last so long. The patient would not be alive for four years with a carcinomatous process in the lung sufficient to give hemorrhage.

So if the facts given are correct I think we should say the hemorrhages and the present symptoms are of separate origin, and I do not know what to say unless they are tuberculous. That is a difficult thing to say in view of the report of normal lungs. Still I do not know what else to say. So the diagnosis is mediastinal tumor in the lung or in the glands, I should suppose in the glands, because it greatly displaces the trachea. So far as I know tumors in the lung itself or in the bronchi do not ordinarily displace the trachea much. I should suppose that the growth started in either the remains of the thymus or some other structure outside the lung itself. There is a metastasis in the brain. In old days I would have very readily localized that metastasis. But I have seen even great surgeons go on the wrong side and say below the tentorium instead of above, and in view of that I do not attempt cerebral localization. Of course most of what we have is on the left side, so if we were going to operate I should say it would be on the left side, and I should suppose above the tentorium. Am I right?

DR. MIXTER: Quite right.

DR. MAURICE FREMONT-SMITH: Don't you think the meningeal symptoms are altogether out of proportion to what one would expect from a metastasis to the brain? I believe we do sometimes get meningeal symptoms from some very low tumors. Here is a very definite meningeal reaction with a spinal fluid which was under very high pressure,—a yellow fluid show-

ing polynuclears. I wonder how one can explain that picture on the basis of a metastasis of a single tumor into the brain. I wonder whether we must not assume some other real meningeal reaction.

DR. CABOT: But then I should have to call it some particular kind of meningitis, and I cannot pin it down to any. I cannot call it tuberculous meningitis or meningitis from an ear disease, or any of the other types that we are familiar with. "Meningismus" is always possible, but I do not like to talk about meningismus. It distracts attention from essential lesions elsewhere.

DR. FREMONT-SMITH: If it were not for the mass in the chest we should think of a brain abscess, should we not?

DR. CABOT: Yes, but we should have to call it brain abscess not communicating with the spinal canal.

A STUDENT: Can you get those figures of high sugar with a meningitis?

DR. CABOT: Not that I know. I think the proper diagnosis is as I have indicated. I do not want to make a diagnosis of meningitis without saying what kind it is, and that I cannot do.

A STUDENT: Wouldn't it be interesting to know if any cultures were made from the spinal fluid?

DR. CABOT: I do not doubt that we should have been told if any cultures had been made.

DR. MIXTER: I should like to ask if at the examination of the spinal fluid made at this hospital there was any estimation of the total protein?

MISS PAINTER: It was 84. The colloidal gold was 0000112110.

DR. MIXTER: The total protein should have been elevated. One would question the report of a normal total protein in the first examination, made before he came to this hospital.

DR. CABOT: I should say that colloidal gold meant nothing.

A STUDENT: What do you think of that nodule on the scalp?

DR. CABOT: I should suppose it was either the same thing that was in the brain and mediastinum or else a wen.

A STUDENT: A dermoid cyst?

DR. CABOT: More probably sebaceous.

A STUDENT: Would that make you think it might be another type of meningitis, such as yeast meningitis?

DR. TRACY B. MALLORY: I can make one suggestion, that in torula meningitis the first report of the cell count is apt to be extremely high. What usually happens is that they count the yeast cells by mistake and throw them all into the lymphocyte count.

DR. MIXTER: . There is one other cause of meningeal irritation which has not been mentioned.

A STUDENT: How about encephalitis?

DR. CABOT: I should not think that ought to be considered. You do not mean hemorrhage?

DR. MIXTER: Yes, I do.

DR. CABOT: I was excluding that on account of the spinal fluid.

DR. MIXTER: We have yellow spinal fluid.

DR. CABOT: That is not enough, is it?

DR. MIXTER: That is enough for hemorrhage within the brain substance.

A STUDENT: Wouldn't you have a high protein in that case?

DR. MIXTER: We should have, but we do not always.

DR. CABOT: I think I should have considered hemorrhage more. I did not lay enough stress on the color.

DR. FREMONT-SMITH: That is not the history of subarachnoid hemorrhage. It does not come on in that way.

DR. MIXTER: No, it is not the history of subarachnoid hemorrhage.

DR. CABOT: I shall still stick to metastatic malignant disease as the most likely diagnosis, in spite of the hints Dr. Mixter has been giving us about hemorrhages.

DR. MIXTER: This case presented a good deal of interest, falling into what one might call three different periods. In the first place we have a patient who comes into the hospital in stupor, with a history which is not particularly clear as at first obtained from his friends and without much mention at this time of hemorrhages five years before; with a high spinal fluid pressure and an abnormal fluid certainly by color, and a tentative diagnosis of brain tumor. Then on account of the fact that we got the report of early hemorrhages films of his chest were ordered. At about the same time a tiny nodule was found in the skin of his scalp over the left ear. With the evidence of the x-ray findings and the presence of the nodule in the scalp, any further attempt at localization of the brain lesion was postponed until the evidence to be obtained from the nodule in the scalp could be definitely proved. Therefore the nodule was removed from the scalp, and confirmed the diagnosis of tumor in the lung, presumably carcinoma. That closed the book so far as surgical treatment went, because metastatic malignant disease of the brain is not open to surgery. Even palliative surgery, such as decompression, is of comparatively little value, and it seemed to us unwise to operate on him at all.

No operation was done. He was put on x-ray therapy in the hope that the disease might respond to radiation. But by following the mass in the chest we found that it did not so respond, and the patient gradually failed and died.

The diagnosis was made from the nodule from the scalp plus the x-ray examination, and as I said, no attempt at careful cerebral localization was made. Our tentative diagnosis on the

intracranial condition was metastatic malignant disease in the left cerebral hemisphere, probably associated with spontaneous hemorrhage within the tumor or above it.

DR. FREMONT-SMITH: The meningeal signs being due to the hemorrhage?

DR. MIXTER: That is what we supposed.

A STUDENT: Do you ever get hemorrhage from a low cerebral tumor?

DR. MIXTER: Sometimes. Not very much, and not usually so severe as this. But here we have a history of pretty rapid progress of the disease during the few days before he entered the hospital, very much more rapid progress than in the several months previous.

DR. CABOT: I should like to hear what you would say as to the argument I made about the hemorrhage five years ago being separate from this condition that he has now. Does a patient go five years after hemorrhage from lung cancer?

DR. MIXTER: I do not know a great deal about carcinoma of the lung. At the same time, we may find pretty large lesions within the lung, either metastatic or original, which are silent. We may find pretty large lesions in the intestinal tract which are silent or which have shown themselves only by intermittent hemorrhages over a number of years. Operable tumors of the sigmoid may give a history of bleeding four or five years previous to the time of operation. So I should think that there was a possibility that the original hemorrhage might have been from a small neoplasm arising in a bronchus perhaps, with gradual extension into the surrounding lung. This was a pretty big lesion as we visualized it by x-ray.

CLINICAL DIAGNOSIS (FROM HOUSE RECORD)

Primary carcinoma of the lung with metastases to the brain and scalp.

DR. RICHARD C. CABOT'S DIAGNOSES

Malignant disease of the lung or mediastinum with metastasis on the left side of the brain above the tentorium.

ANATOMIC DIAGNOSES

1. *Primary fatal diseases.*

Primary carcinoma of the bronchus to the left upper lobe with metastases to the brain, the dura and the posterior lobe of the hypophysis.
Cerebellar hemorrhage.

DR. MALLORY: We found at autopsy a primary cancer of the bronchus leading to the left upper lobe. The tumor mass we estimated at about 3.5 centimeters in diameter. There was a little bloody fluid in the pleural cavity on that side. We found very little else of interest until we got to the head, where a small tumor was found partly in the brain substance, partly in the dura overlying the left parietal lobe. We also found a small focus of hemorrhage in the left lobe of the cerebellum, apparently unassociated with the tumor. So that I think we must say he had both metastatic tumor and hemorrhage. Microscopically we found a very small area of metastasis in the posterior lobe of the hypophysis.

I think the frequency with which primary cancers of the lung metastasize to the brain is something that probably no one except neurosurgeons realize. The most recent and most voluminous work on primary carcinoma of the lung, you remember, comes from Dr. Cushing's clinic, and I think that is largely due to the fact that those cases came there—many of them, not all by any means—because they had brain metastases. It is very characteristic, we might almost say of pulmonary lesions in general, to metastasize to the brain.

DR. MIXTER: As we went over the x-rays in this case the skull plates were negative. The chest showed this mass, the rest of the lung fields being clear. There was a high diaphragm on that side, and on the basis of that Dr. Holmes's department made a diagnosis of tumor, probably carcinoma. The reason why these lung plates were taken immediately or soon after the entry of this patient into the hospital was because we had the history of hemorrhage five years previously, also because about a week before this I had been caught with this same problem in another case. I had operated on a patient with evidence of a brain tumor causing Jacksonian epilepsy, found a very nice nodule in the dura involving the cortex which was completely blocked out and on which Dr. Mallory gave the diagnosis of metastatic carcinoma. We had had some x-rays taken of that patient and found the same lesion. I believe that Dr. Cushing's clinic reported 27 cases, and of those 27 cases of pulmonary tumor nine had brain metastases.

DR. GEORGE W. HOLMES: I am sure we have found a considerable number here. The signs on which we based such an interpretation are first the mass near the root of the lung. Most of these tumors arise in the bronchus, not in the parenchyma. For this reason we should expect some interference with the passage of air either into or out of the lung. The first sign is increased brightness, and as the disease advances there is increased density and a high diaphragm, the result of plugging of portions of the bronchus. The ragged indefinite margin of the tumor is more suggestive of a malignant than of a benign tumor such as aneurysm or enlarged glands. It is not lobulated as we expect in Hodgkin's or other conditions which cause enlarged glands, and there is no evidence

of a mass on the opposite side, which is usually present in lymphoma.

A STUDENT: Would you make an interpretation in life on looking at that plate? Could you say whether the tumor was in the mediastinum or whether the lung was definitely involved?

DR. HOLMES: The tumor lies well to the right of the mediastinum. Tumors of the mediastinum itself are not so common as tumors of the lung, at least in this clinic. Under the fluoroscope we can determine whether the tumor is anterior, posterior or lateral.

DR. MALLORY: I should like to bring up one other point,—the question of meningeal symptoms with tumor. We have two cases of metastatic malignancy in the meninges, both of which were diagnosed clinically as meningitis. Carcinoma was not even considered. In one of them we did an autopsy and found a diffuse slight thickening of the meninges and a number of extremely minute miliary nodules all through the lungs, and we signed the death certificate, "miliary tuberculosis". About two weeks later the slides came through. Much to our surprise we found that the miliary nodules were all carcinoma. The patient was under twenty years old. The thickened meninges showed a diffuse infiltration with carcinoma; there was no tumor in the brain itself at all. That case had had a fairly high cell count, 50 to 100, in the spinal fluid. The more recent case was more obvious at autopsy because there were gross metastases in the brain. It too showed 50 or more lymphocytes in the spinal fluid. It is not at all uncommon for cancer when it is invading tissues to provoke more or less inflammatory response around its advancing border. I think that is often true of metastatic lesions of the brain. Perhaps from that inflammatory margin of the tumor, lymphocytes may escape into the spinal fluid. I am quite sure that certain tumors can give every symptom of meningitis, quite indistinguishable from the symptoms of true meningitis.

A STUDENT: How often do you get pleural effusion in cancer of the lung?

DR. MALLORY: Very commonly, especially if at some point the growth gets out to the pleural surface.

A STUDENT: How do you account for the hemoptysis five years ago?

DR. MALLORY: That is a very interesting point. I have talked it over with Dr. Churchill, and we are both inclined to believe it was caused by the tumor. We do not really know much about the life history of these tumors of the lung. Every once in a while one gets a case such as this, in which there is a suggestion that the tumor has existed for a number of years before any definite symptoms occurred. In general, carcinoma of the lung is a pretty silent disease until it reaches a late stage. We do not know how long the tumor may have existed in a small localized form before our attention is called to it.

A STUDENT: Were there any changes in the vessel walls of the cerebellum where the vessel burst?

DR. MALLORY: We have no microscopic examination of them.

A STUDENT: Have tumor changes in an intracranial vessel any relation to hemorrhage?

DR. CABOT: They are perfectly separate things.

DR. MIXTER: I expect the hemorrhage would be within the tumor or about it.

EPICRISIS

DR. CABOT: I think it is well to record after such an autopsy as this some of the points that I find especially instructive. There are four:

(1) That we are extraordinarily apt not to consider metastatic brain tumors in cases coming under observation for what are obviously brain symptoms when the primary tumor is altogether silent. In every person past middle life and showing evidence of organic brain disease we should consider metastatic growths.

(2) That a metastatic brain tumor may closely simulate meningitis; indeed, that it may simulate it more closely than in this case, since, as Dr. Mallory has told us, brain tumor may produce an increased number of lymphocytes in the spinal fluid owing to the lymphocytic reaction around the tumor.

(3) That a bronchial carcinoma may last five years and be wholly latent for four and three-quarters years out of that five.

(4) That a bronchial carcinoma can apparently produce pulmonary hemorrhages five years before it finally kills the patient, with no other hemorrhages during the intervening years.

CASE 19032

PROLONGED ANEMIA WITH ORAL SEPSIS AND OTITIS MEDIA

CHILDREN'S MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. WILLIAM M. GAMMON:* A six year old boy was admitted to the hospital on March 17, extremely anemic. He had been sent in for diagnosis and treatment.

He had had no serious illnesses up to the previous August, when he developed a black, ugly looking sore the size of a dime on the lower lip which did not heal for three weeks. Two weeks after the appearance of this lesion a purpuric rash appeared over both legs. This did not extend above the knee. The patient had no particular complaints, but seemed paler than

*Recently interne on the Children's Medical service.

normal and said that he got out of breath on going uphill. One week before the beginning of school he was vaccinated; there was a normal take, and the vaccination did not look particularly angry. The mother said, however, that he had a temperature of 103°, was in bed two days and vomited. After a few weeks at school the school doctor noted his pallor and he was referred to a hospital. His red blood count on admission was 1,700,000. He had nosebleeds on six different occasions, his red blood count dropping to 700,000. He was not transfused, but was given a diet high in iron and liver. He improved sufficiently to go home soon after Thanksgiving, and was well at home for a few weeks. Then he had further nosebleeds and lost his appetite. In January he was readmitted to the hospital. A transfusion was given and the previous treatment again carried out. In the middle of February he was sent home, but did not do well. He ran a fever of 103° to 104° and had a cough. March 10, one week before admission to this hospital, he had earache and discharge from the right ear.

Family history. The father had never been ill. The mother was fairly well; she said she had had attacks of dizziness all her life. There had been two miscarriages, one from toxemia and one induced. One sister and two brothers were well.

Physical examination on admission. The patient was fairly well developed but extremely pale. A foul breath was noticed. There was appearance of old blood clots in his nose. The left lower jaw was swollen, and there was a necrotic bleeding point in the molar region. The cervical and axillary glands were palpable but not enlarged. The right ear drained purulent material. The lungs were normal. There was a soft blowing systolic murmur heard at the apex of the heart.

Laboratory work on admission. Blood examination showed 800 white cells, 1,150,000 red cells, hemoglobin 1.022 Sahli, platelets 10,000; smear, 14 per cent polymorphonuclears, 82 per cent lymphocytes, 3 lymphoblasts, unclassified, 1; marked anisocytosis and poikilocytosis. The urine was negative. The stool was black and tarry; there was a positive test for blood. Wassermann was negative. Blood culture showed staphylococcus aureus.

Clinical course. On the afternoon of admission the patient was given a transfusion with 200 cubic centimeters of citrated blood. The next day he was started on a course of treatment with nucleotide 5 cubic centimeters intramuscularly twice a day, preceded by 1/250 grain of atropine. Two days later the dose was changed to 10 cubic centimeters twice a day, and the injections were continued for sixteen days. A chart of his blood counts is shown. In the meantime the patient continued extremely pale and weak, both ears drained a purulent material, his nose bled on several different occasions and his temperature varied between 100° and 105°. The gangrenous stomatitis at the site of the lower left molars became progressively worse; a large ulcerated area developed. The patient was given a small transfusion on April 5 and another on the sixth. He died on April 7.

BLOOD EXAMINATIONS

Date	Red cells	White count	Hemoglobin	Treatment
Mar. 17	1,150,000	800	1.022	Transfusion
18	1,670,000	1050		Nucleotide 10 c.c.
19	1,350,000	750	1.032	" "
20	1,130,000	1240	1.024	" 20
21	1,180,000	900	1.026	" "
22	1,200,000	750	1.026	" "
23		800		" "
24	930,000	850		" "
25	1,000,000	875		" "
26	880,000	1200		" "
27		1400		" "
28		1950		" "
29	1,100,000	1950		" "
31		1650		" "
Apr. 1	1,240,000	1700		" "
2		1200		" "
3	1,550,000	1550		" "
4		2100	1.027	" "
5		2600		Transfusion
6	740,000	7950		Transfusion

Clinical Discussion

Dr. Harold L. Higgins: We have a case here that is quite evidently one of aplastic anemia; there are diminished numbers of platelets, of red cells and of white cells; there are marked anemia, agranulocytosis, frequent hemorrhages and a stomatitis which was tending to become gangrenous. He also had a heart murmur which we feel was due to his anemia. The course was about seven months.

The etiology is indefinite. Apparently the ulcer on his lip marks the beginning of the illness. If his vaccination had occurred two or three weeks earlier it might have been blamed for the aplastic anemia; but the purpura and the anemia appeared before the vaccination. We are forced to conclude that we have a rather progressive aplastic anemia of unknown cause found in the bone marrow.

The treatment here was with nucleotide. It may have kept him from getting any worse for a while, in fact his white blood count increased from 800 to 2,100 under this treatment. He did not however improve satisfactorily. As he seemed to be getting worse towards the first of April, it was felt necessary to resort to transfusions, which raised his white cell count but did not save his life.

The general feeling, as I understand it, of those who have worked on agranulocytic cases is that the giving of transfusions tends to lower the white cell count rather than to increase it, at least more than temporarily.

DR. RICHARD C. TEFFT: We did not consider very seriously that it was a real agranulocytosis, and thought it probably belonged to the leukemic group, but because we did not know anything else to do we gave him nucleotide, thinking that it would not do any harm.

One interesting thing about him was that desperately ill as he was, with a temperature of 106° at times, he would sit up in bed happy and apparently not particularly ill.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Aplastic anemia.
Agranulocytosis.
Bilateral otitis media.
Cardiac dilatation.

ANATOMIC DIAGNOSES

Erythroblastic anemia.
Central necrosis of the liver.
Septicemia, streptococcus.

PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: The gross autopsy did not show very much that was striking. There was evidence of very chronic oral sepsis here, including marked ulceration of the gums and probably a certain degree of osteomyelitis of the jaw. Blood cultures showed a hemolytic streptococcus and we also grew a streptococcus in the culture from the jaw.

Microscopically this case shows a totally different picture from the last one. (Case 18402, published October 6, 1932.) The bone marrow here instead of being aplastic is markedly hyperplastic. The hyperplasia so far as I can make out is almost wholly in the red cell series. There are very few mature neutrophiles, very few myelocytes, a moderate number of eosinophiles. In nearly all blood diseases the eosinophiles seem to be slightly increased in the marrow or else more persistent than the other elements. The great majority of the cells appear to be quite immature, many of them unclassifiable, but those that we can classify seem to be megaloblasts or cells of the early red cell rather than the white cell series. Histologically the picture is a little more reminiscent of pernicious anemia than of anything else, although the clinical course of the disease does not make that at all probable. In the marrow of these bones the cells are as numerous and as closely packed and the replacement of the tissue is as extensive as it was in that leukemic marrow which I showed you in Case 18341, published August 26, 1932, but the cells appear to be all of the red cell series rather than of the white.

The sections from the lymph nodes show very marked hyperplasia but nothing suggesting a leukemic infiltration, and I cannot make out any red cell formation in the nodes.

The liver shows central necrosis, quite acute in type, directly referable to his terminal streptococcus infection and of no further significance.

We have had this winter two other cases fitting very closely this clinical picture of a fairly rapidly progressive disease, varying from perhaps two to six months in duration, characterized by a very high grade of anemia and also by an extremely marked leukopenia. The question of agranulocytosis has come up in each of these cases. The lack of neutrophiles in the circulating blood that occurs in a variety of diseases and clinical syndromes is an interesting point for discussion. There are of course well known cases of apparently normal people who have at all times a very low neutrophile level. There are other people who have periodic crises which may be totally symptomless in which the neutrophiles drop almost to zero. In pernicious anemia a moderate degree of neutropenia is the rule. Sometimes it is fairly marked. Neutropenia alone, it seems to me, is not sufficient to warrant a diagnosis of this syndrome they call agranulocytosis or malignant leukopenia. Those cases, the characteristic ones at least, have a greatly diminished white cell count, almost all the diminution being in the neutrophiles. They usually show marked sepsis, usually oral, and also rather characteristically sepsis with organisms of a low virulence. Vincent's angina is perhaps the commonest coincident infection. but there are other peculiar infections such as acute sore throat from which pure cultures of bacillus subtilis and micrococcus catarrhalis or B. pyocyaneus have been grown.

It does not seem to me that these cases of severe anemia with coincident leukopenia ought to be put into the same class with typical agranulocytosis, in which anemia if present is never severe. I have no name to give them, but I think it is a different disease, and I think this case probably falls into that group.

DR. HIGGINS: Do you know whether nucleotide would cause a change in the bone marrow, or perhaps change the bone marrow in Case 18341 to a bone marrow like that of Case 18402?

DR. MALLORY: Nucleotide given to a normal animal will produce the formation of myeloid cells through the marrow even in those bones where the marrow normally shows quite marked formation of white cell elements. In this case there is apparently nothing in the marrow but red cell formation. Also nucleotide given to people with a low neutrophile count will push the count up distinctly.

A PHYSICIAN: Could the case be one of pernicious anemia?

DR. MALLORY: I can remember having seen apparently typical pernicious anemia in a patient of sixteen.

DR. WYMAN RICHARDSON: That is very rare indeed. It has been reported in very young children, but one is always a little skeptical.

DR. MALLORY: When this child was in the hospital he had liver with slight temporary improvement. If it had been true pernicious anemia I should think the improvement ought to have been more marked.

A PHYSICIAN: Was there any evidence of gastro-intestinal bleeding?

DR. MALLORY: There were petechial hemorrhages in the intestines, as there were in the skin.

DR. RICHARDSON: It is very difficult to escape the feeling in these cases that there is some internal deficiency perhaps similar in nature to pernicious anemia. It seems to me the work with nucleotide very much confirms that feeling. It is fair to hope that a good deal will come of it.

DR. MALLORY: I have a strong feeling that the interest in the agranulocytic syndrome that has been aroused in the last few years has probably made us a little too enthusiastic in the diagnosis of agranulocytosis.

DR. GREENE FITZHUGH: There is often no anemia in agranulocytosis, and reduction of platelets, hemorrhages and petechiae is rare. These cases showed anemia, reduction of platelets and hemorrhages at different times, evidence against the presence of true agranulocytosis.

DR. MALLORY: Of course this syndrome of leukopenia is another typical example of our frequent uncertainty in many coincident affections as to which is the cart and which is the horse. We do not know whether sepsis develops as a result of previously abnormal blood or whether the blood abnormality is the result of sepsis. The majority of cases rather suggest the former, particularly when we get cases of sepsis with an organism of low virulence. We occasionally get a case which seems to fall into the latter classification, in which we usually grow hemolytic streptococcus. We need to see a great many more of these cases before we can come to any final explanation of them.

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DIPHTHERIA TOXOID*

THE claim has been made, and repeated again and again with increasing emphasis, that diphtheria toxoid is a better immunizing agent against diphtheria than toxin-antitoxin mixture. Before accepting this statement at its face value it is desirable to review the facts upon which it is based. If toxoid is to be accepted as a "better" immunizing agent than the widely accepted and used toxin-antitoxin mixture, it must be at least as harmless; it must cause as few if not fewer local and general reactions; it must stimulate the production of active immunity as rapidly or more rapidly; it must render immune as high a percentage of persons receiving it; it must produce as high a degree of immunity in the individual; and the immunity so developed must be as lasting as that induced by toxin-antitoxin mixture.

These questions can now be largely answered. Diphtheria toxoid, being diphtheria toxin deprived of its toxic properties by the action of formaldehyde and heat is, in the doses recommended, harmless for experimental animals and for children. Consisting as it does of the undiluted filtrate of the whole broth culture of diphtheria bacilli, it may and frequently does cause both local and systemic reactions of varying severity in persons over six years of age. Because these reactions may be troublesome and disturbing, some makers of this product recommend that its use be limited to children not over six years of age, while some manufacturers supply with the toxoid a test solution of diluted toxoid by which one can determine whether the person to be given the toxoid would suffer such a reaction. If the result of the test is positive, the toxoid is administered in smaller doses or not at all, or diphtheria toxin-antitoxin mixture is substituted. In Toronto's experience, it was found that ten per cent of the public school children reacted positively to the test dose and no toxoid was given them. It seems safe to conclude, therefore, that for the present at least toxoid should be given routinely only to children of six years of age or less.

As to the promptness with which immunity is developed, there is little doubt that toxoid is a more efficient immunizing agent than toxin-antitoxin. This is shown when the successful result of the immunization is measured by the percentage of Schick-positive persons who are rendered Schick-negative. However, it must be pointed out that the advantage may be more apparent than real, since some of the reported figures are based on studies in which the antigenic value of the various preparations was not previously determined, or in which the intervals between injections and the doses injected are not comparable.

Again, according to the most recent studies of Ramon and his colleagues, toxoid possesses the advantage over toxin-antitoxin mixture in that it produces, as a rule, in the immunized individual a higher degree of antitoxic immunity as measured in units.

The question concerning the relative duration of immunity produced by these two agents is as yet susceptible of only a tentative answer. Ramon, who recently tested, with the Schick test, children who had been rendered immune five years ago, reported that he found ninety-four per cent of them to be still Schick-negative. It seems quite likely, therefore, that the antitoxic immunity produced by diphtheria toxoid will prove to be as enduring as that following immunization with diphtheria toxin-antitoxin.

There are other published statements regarding toxoid that may be included in the present discussion. One of the most definite claims made by the proponents of toxoid is that since it contains no antitoxin it cannot sensitize the recipient to horse serum protein and, therefore, eliminates

*We refer our readers to the letter from Dr. George H. Bigelow, Commissioner of the Massachusetts Department of Public Health, appearing on page 169 of this issue.

the danger of anaphylaxis should such a person subsequently be given any serum of equine origin. It is our opinion that the fear of the harm caused by the possible sensitization set up by the minute amount of horse serum proteins in toxin-antitoxin mixture has been greatly exaggerated and overemphasized. We have never seen the necessity or desirability of substituting antitoxin from goats or from sheep for that obtained from horses in making the toxin-antitoxin mixtures. While it is conceivable that three injections of the usual toxin-antitoxin mixture may produce hypersensitiveness to horse serum, it is doubtful if the hypersensitiveness is of such a degree as to result in a harmful reaction to a later injection of horse serum.

Another point to be discussed is the dosage and the intervals between doses of toxoid where the maximal individual and mass protection is desired. While at first only one and then two injections of toxoid were advocated, the best opinion now holds that a higher percentage of immunes and a higher degree of individual immunity can be accomplished by three injections (Ramon sometimes uses four) of toxoid at intervals of three to four weeks. Both laboratory experiments and observations on controlled series of children confirm this opinion.

It would seem then that diphtheria toxoid is in fact a better immunizing agent than diphtheria toxin-antitoxin mixture, but one should not forget its limitations and, until toxoid can be freed from its side-reactions, we should not entirely abandon the use of toxin-antitoxin mixture.

MEDICINE AND OTHER BOARDS OF REGISTRATION IN MASSACHUSETTS

It would be interesting and perhaps amusing, if the causes of some of our eccentricities and inconsistencies were brought to light. Sometimes we surprise ourselves by our past. Generally it is some one else who, in a disagreeable and irritating way, reminds us of what we may not like to remember. The inexorable logic of the law is a figment of the imagination. It is the "fluidity of the facts", as William James used to say, and the immanent illogic of the law, if one may use that expression, that give occasion for controversy, opportunity for sophistry and the justification for efforts toward improvement.

An inconsistency that is amusing in character, yet serious in consequences, is that found in the statutes authorizing the various boards under the Division of Registrations in Massachusetts. Ten boards of registration are noted including one for each of the following: Physicians and Surgeons, Chiropodists, Pharmacists, Dentists, Veterinarians, Optometrists, Nurses, Embalmers, Barbers, and Certified Public Accountants.

Some of these callings are characterized by the law as "business", some as a profession which one "practices". To follow any of them the candidate must be registered by a board after examination. The qualifications vary: for some, special formal preparation is required, as by apprenticeship or by instruction in a school. The law makes no mention of a school in which pharmacists, veterinarians, or embalmers may receive preparation for the pursuit they have chosen. In optometry and in barbering, the candidate may have served an apprenticeship with a qualified practitioner, or may have been trained in a school. In medicine, chiropody, dentistry and nursing, formal preparation in a school is demanded. In chiropody that school must be "reputable", but this quality is not defined in the law; in dentistry a "reputable" school is defined in detail; in nursing the school must be "approved" by the board and no qualifications are set forth; in optometry the school must be "approved" by the board, with some qualifications specified in detail; in barbering the school must fulfill many detailed conditions and be "properly equipped and conducted".

That is to say, every board in the Division of Registration that accepts candidates from a school has some power of approval of the school, except the board of registration in medicine. As Epictetus said, "The question is: Are we in our senses or are we not?"

THIS WEEK'S ISSUE

Contains articles by the following named authors:

Walker, Irving J. A.B., M.D. Harvard University Medical School 1907. F.A.C.S. Surgeon-in-Chief, Harvard Surgical Teaching Service, Boston City Hospital. Clinical Professor of Surgery, Harvard Medical School. His subject is "A Comparative Mortality Study of Acute Appendicitis." Page 113. Address: 520 Commonwealth Avenue, Boston.

Adams, Donald S. M.D. University of Virginia 1917. F.A.C.S. Junior Visiting Surgeon, Memorial Hospital, Worcester. His subject is "Appendix Abscess: Operation Without Removal of the Appendix." Page 123. Address: 36 Pleasant Street, Worcester, Mass.

Christian, Henry A. A.M., LL.D., Sc.D. (Hon.) M.D. Johns Hopkins University School of Medicine 1900. Hersey Professor of Theory and Practice of Physic, Harvard University. Physician-in-Chief, Peter Bent Brigham Hospital. His subject is "What is Nephrosis?" Page 129. Address: Peter Bent Brigham Hospital, Boston.

Barr, Joseph S. B.S., M.D. Harvard University Medical School 1926. Assistant in Or-

thopedics, Harvard Medical School. Assistant Orthopedic Surgeon, New England Peabody Home for Crippled Children. Assistant in Orthopedics, Massachusetts General Hospital. His subject is "Heliotherapy in the Treatment of Surgical Tuberculosis." Page 131. Address: 234 Marlborough Street, Boston.

PARSONS, RUTH I. C.P.H. and TURNER, C. E., Dr.P.H. For further information see This Week's Issue, page 47, issue of January 5, 1933.

HAWES, JOHN B. 2ND. A.B., M.D. Harvard University Medical School 1903. President, Boston Tuberculosis Association. Director, Massachusetts Tuberculosis League and National Tuberculosis Association. Address: 11 Marlborough Street, Boston. Associated with him is STONE, MOSES J. M.D. Tufts College Medical School 1921. Assistant Professor in Diseases of the Chest, Boston University Medical School. Examiner in the Tuberculosis Clinics of the Boston Health Department. Physician at the Chest Clinic of the Massachusetts Memorial Hospitals. Assistant in Medicine, Beth Israel Hospital. Address: 11 Marlborough Street, Boston. Their subject is "Progress in Tuberculosis 1931-1932." Page 141.

QUINBY, E. MELVILLE. M.R.C.S., L.R.C.P., D.M.D. His subject is "The Influence of Paracelsus on Modern Therapy." Page 162. Address: 45 Newbury Street, Boston.

SIR ROBERT JONES, BART.

ONE of the most distinguished of surgeons and the most beloved of men inherited great riches. These were a gentle and unruffled disposition, a strong and winning personality, a keen and searching mind, a warm and merry heart. He earned still greater wealth: the gratitude of crippled children; the surcease of wounded men; the honors of his country; the respect and affection of his colleagues. He has left to the world the greatest of all heritages, —an ideal of conduct.

Robert Jones was a Welshman and began his career as a general surgeon in Liverpool associated with his uncle Hugh Owen Thomas. Early in his medical life he became acutely interested in the rehabilitation of the physically handicapped. Before he was well known in London, his extreme worth was discovered by a few. Dr. John Ridlon of Chicago was one of the few, and they published a book together: Dr. James S. Stone of Boston was another, advising American doctors visiting England to spend most of their time with this provincial Liverpool surgeon. Those who followed this advice became his disciples. Energy, courage, resourcefulness, skill, kindliness, cordial welcome and an unusual capacity for friendship were his constant attributes. In those early days it was a lasting memory to spend a working day with him. In the morning, consulting rooms filled with patients rich and poor; to each something of himself, like Osler; unusual methods deftly executed; simple, efficient, comfortable apparatus, quickly applied; immediate comradeship with the children; complete confidence of the adults; no criticism of bungling consultants; no hurry; no waste of time; alert joy in the work. Then a snatch of delicious luncheon with Mrs. Jones at a perfectly appointed table; a waiting car and the sweet smelling countryside for fifty miles; a fresh air hospital; expectant smiling children; expectant smiling nurses; expectant ready young surgeons; a run through the wards, uproarious but discerning; the clean little operating room where the visitor must scrub up with irreproachable thoroughness; two teams of nurses and assistants; twenty-seven operations all done by him between three and ten, with twenty minutes for tea; asepsis perfect; technique exquisite; songs on the drive back in the dark; a relaxing dinner well earned. Then the sleep of the just and of the kind; tomorrow may be like today.

When the war came on Sir Alfred Keough, director general of the British Medical Service, knew this man and placed him in charge of all the bone and joint casualties sent back to the base hospitals of the British Isles. He rose to the rank of Major General. There were enough hospitals but few surgeons trained in bone and joint surgery. There were thousands of wounded men. Without added help the task became well-nigh impossible when the United States entered the war. Harassed and weary, through the British Medical Department, he appealed to the American Surgeon General. Within six weeks of the time that America entered the war, a group of twenty finely trained bone and joint surgeons commissioned as medical officers were waiting on the docks at Liverpool assigned to service under General Jones. More and more American officers were ordered to these hospitals as the months went on. It was a great service to the British, but a greater to the Americans, for the training which these men received under the Master enabled them to later serve our own troops with greater skill.

The war over, came knighthood and later a baronetcy and the highest honors which the Medical Associations of Great Britain and foreign countries could pay. But there was no cessation of happy labor. The crippled child must be cared for, not only in the garden spots which he had established near Liverpool, but throughout England and Scotland and Wales. Before he died, his planning and the appeal of his enthusiasm had realized a network of hospitals and orthopedic centers and the opening of county purses for their support. Perhaps nowhere in the world has the crippled child

such a chance for rehabilitation as in England today. Twelve years ago a far different situation obtained.

Sir Robert numbered many Americans among his close friends. He made several journeys to the United States; with Dr. Robert W. Lovett he wrote the outstanding textbook of Orthopaedic Surgery. Honorary degrees were conferred upon him by Harvard, Yale and Smith. Nothing changed him, but the years made him more admirable and more dear. He died on January 14, in his seventy-fourth year, in the full vigor of his mind and active in practice. "Beati mites", he did indeed inherit the honor and love of the earth.

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MEDICAL HISTORY CLUB

DR. CHARLES F. PAINTER opened the first meeting of the 1932-1933 sessions, which was held November 25, and delivered the Presidential Address as follows:

Gentlemen: We are entering upon the second decade of our existence as a Club. It is interesting to see whether a decade has done anything to stimulate interest in the subject of medical history in this community and, if so, how it has been accomplished. The outstanding fact to which we may point from a study of the practical evidence which has a bearing on this question, viz., attendance at these meetings, is this, that not until the graphic method of presenting this subject was introduced by Dr. Spector was there any appreciable increase of interest in medical history, in this vicinity over and above the small group who are historically minded. Up to that time the average attendance was less than thirty, measured by two-year periods. The two-year interval, in which the pageants have been given (1930-32), showed an average of 57. This increase was not wholly due to attendance upon the pageants themselves, for during that time there were four meetings, exclusive of and subsequent to the first pageant, when the attendance was 35, 43, 56 and 59. So it would appear that some who attended the pageants had an interest which had not existed before, suggesting that the fault may have been the unattractiveness of our programs. After all, unfortunate as it is, an interest in history whether in school, college or professional life, does not attract nearly so many students as it should, for we are not inclined to appreciate its significance at a time when such concentration on the subject would clarify and stimulate our appreciation of the great forces of civilization. After the period has passed when we think our education has been completed, we are too busy or too complacent to be easily stirred by interests which have not been cultivated up to that time. It is partly for this reason that the pageants have been successful in increasing the desire for knowledge of the subject—a sort of intellectual stimulant. Not all of us resort, habitually, to an artificial incentive to our appetite for dinner. We manage to retain an interest in our nutrition without such an agent. However, we had learned to enjoy our food long before we knew what a spirituous stimulant was, and our normal physical or mental activity was the natural stimulus to our appetites. We should not habitually require an artificial aid to our *historical* appetite, however pleasant it is, on occasion, to have it. We should desire it for its own sake and so I trust that, as we go along in our second decade, we shall be attracted by the menus presented by the Medical History Club, because we increasingly realize that they help us to balance our intellectual diet.

Our first paper this evening approaches the life of Paracelsus through the medium of Browning's poem of that name. This poem, dramatic in form, one of the author's first major ventures in the field of poetic interpretation, was written when he was 21 and had little success in its appeal to the readers of that period (1835).

THE INFLUENCE OF PARACELSUS ON MODERN THERAPY

BY E. MELVILLE QUINBY, D.M.D.*

PREFACE

IT must be understood at the outset that any complete and thoroughly satisfying dissertation in connection with the title above, would necessitate the writing of a book of imposing dimensions. To set down, therefore, any worthwhile account of Paracelsus and his work will require considerable abbreviation and condensation of available Paracelsiana.

It should be remembered, too, that although Paracelsus was born in 1493, it was not until 1833 that he was restored to his rightful position in society as a Pioneer in Medical Research, rather than the braggart and impostor that contemporary writers, such as Erastus, have pictured him. (Anna M. Stoddart—"Life of Paracelsus"—preface.)

The most remarkable feature of this new birth was the fact of its origin, viz., through the publication of a poem by Robert Browning, aged twenty-one. By dint of browsing in the library of his father, young Browning discovered considerable Paracelsiana, in various languages and forms; and spent a great deal of time in translation thereof. The effects of this perseverance and perspicuity had a twofold result—1, the writing of the poem, "Paracelsus"—"a dramatic revelation of a soul". 2, The initiation, several years later, of a concerted movement by students at Leipzig, Berlin, Vienna and Salz-

*For record and address of author see "This Week's Issue," page 160.

burg to subject the evidence concerning Paracelsus, to a searching and unprejudiced examination. Among others, Dr. Sudhoff published two volumes of "His attempt at a critical estimate of the authenticity of Paracelsian writings"—Berlin 1894. Ibid.—preface.

A searching and critical examination also of all oil paintings, sketches, copper plate engravings and woodcuts was made by Dr. Carl Aberle, who made many journeys in the cause.

Authentic writings of Paracelsus were subjected to a close scrutiny by Dr. Julius Hartmann, and the published results had all the appearance of an autobiography of Paracelsus, so religiously did Dr. Hartmann adhere to his text. Then again in Vienna two professors, Franz and Carl Strunz gave lectures to the students on Paracelsus; and an addition of Paracelsus' works in original German with explanatory notes was published. This edition dealt mainly with the "Paragranum" and the "Paramiram." Ibid.—preface.

In 1911 Anna M. Stoddart of England published a Life of Paracelsus; and the authoress writes: "To Browning's poem this 'Life' owes its inspiration; to those pioneers and to his own (Paracelsus') works it owes its authenticity."

It is interesting to note that Dr. Maignan, biographer for Ambroise Paré (born 1517) admitted Hohenheim's (Paracelsus') services to science.

To appreciate thoroughly the magnitude of the task undertaken by Paracelsus to reform the practice of medicine, it must be remembered that the world of medicine was dominated by the teaching, and practices, of Claudius Galen (born 130 A. D.) the great dictator for 1400 years of the Healing Arts.

To what extent the theories of Hippocrates, 460 B. C. and Aristotle, 387 B. C. may have influenced Galen is not in the scope of this article to define.

It may be noticed, however, that the times were to some extent favourable to a new-birth, when we remember that Luther was born in 1483; Mirandola died in 1494; Ambroise Paré was born in 1517; and Copernicus was a contemporary. Ibid.—Chap. II, page 30.

As R. B. writes:

"The Ages

Coming and going all the while, till dawned
His true time's advent."

PARACELSUS—THE MAN

The subject of our sketch first saw the light in 1493 at Einsiedeln, a little town in the canton of Schwyz not far from Zurich. He was the son of a physician, Wilhelm Bombast von Hohenheim, a brother of George von Hohenheim, who became Grand Prior of the Order of Malta.

According to the Biographie Universelle (Paris 1822) young von Hohenheim was named (Philippus) (Aureolus) Theophrastus Bombastus ab Hohenheim, but later adopted the name Paracelsus, the meaning of which has given rise to much speculation but may have reference to a self-claimed superiority to Celsus, a physician of Rome.

It is generally conceded that Paracelsus' early education was limited to instruction in the rudiments of alchemy, surgery and medicine by the elder von Hohenheim. It is certain, however, that Paracelsus came under the influence of several learned teachers of whom the most notable and influential was Trithemius, Abbot of Wurzburg, a master of magic, alchemy and astrology. Under this influence Paracelsus acquired a taste for occultism, which he was determined should be used for the benefit of humanity. Trithemius was an advanced scholar, and belonged to the order of mystics, who doubtless carried on the doctrines handed down from time immemorial through such groups as Summerian, Accadian, Babylonian, Assyrian, Egyptian, Indian, Persian, Phoenician, Arab, Hebrew, Greek, Roman, Goth, Celt, Teuton, Tartar and Mongolian. These doctrines as practised by Trithemius and taught to Paracelsus were probably but "whispers, or fragments"—strange survivals of those ancient races. Ibid.—Chap. III, page 44.

This tendency to practice the so-called Magic Arts has been much criticized, but it should be clearly understood that a physician could not maintain any position as a healer unless he professed an intimate knowledge of occultism.

All the teaching derived from the monasteries and colleges was founded on Authority. But the texts of the discourses handed down from Greek and Roman physicians, were copied and recopied from and by one another and suffered very seriously from errors in such re-translations and inheritance. The original copy may have been in Greek, was then reproduced in Latin—then in Arabic, and thence perhaps in medieval Latin again. Ibid.—Chap. II, page 34.

Although a student of Alchemy, Paracelsus claimed that "Alchemy is to make neither gold nor silver; its use is to make the supreme essences and to direct them against diseases."

In the poem Paracelsus speaks: ". . . and hence

I can abjure so well the idle arts
These pedants strive to learn and teach; Black Arts
Great Works, the Secret and Sublime forsooth—
Let others prize; too intimate a tie
Connects me with our God! A Sullen fiend
To do my bidding, fallen and hateful sprites
To help me—what are these, at best, beside
God helping, God directing everywhere,
So that the earth shall yield her secrets up
And every object there be charged to strike,
Teach, gratify, her master God appoints."

Reverting to the type of training to which Paracelsus was subject in his earlier years, it seems that Dr. W. von Hohenheim was a firm believer in open-air treatment for the child, who was delicate and inclined to rickets. When he

was old enough Theophrastus accompanied his father in country walks which were enlivened by talks on the flora of the country-side, mountains, forest, swamp, meadow and roadside. Ibid.— Chap. II, page 24.

The names and uses of herbs in the healing art, as potions, lotions and as poisons were fully explained to the boy.

What this viva voce teaching meant can be understood only when we realize that—unlike China, Egypt, Judaea and Greece—Europe had no registered pharmacopoeia at this time. Ibid. —Chap II, page 24. It is on record that the first European pharmacopoeia was registered in Nuremberg in 1542, the year after Paracelsus died. But most of the herbal medicines, with which we are acquainted now, were known in the Middle Ages; and met with special cultivation in monasterial gardens.

But as one writer says—"they were often administered inaccurately and patients were forced to swallow mixtures which added to their sufferings, and sometimes hastened their end". E. Berdoe, B. Cyclopedia—page 316. As we shall see later, an attempt on the part of Paracelsus, the Physician, to rectify the mode of drug administration led to the most bitter antagonism of the local apothecaries. In the Poem the following example is given:

". . . So take notice
This jewel dangling from my neck preserves
The features of a prince, my skill restored
To plague his people some few years to come.
. . . . . .
I came to see. Here, drivelled the physician
Whose most infallible nostrum was at fault;
There quaked the astrologer, whose horoscope
Had promised him interminable years;
Here a monk fumbled at the sick man's mouth
With some undoubted relic—a sudary
Of the Virgin; while another piebald knave
Of the same brotherhood . . .
Was actively preparing 'neath his nose
Such a suffumigation as, once fired
Had stunk the patient dead ere he could groan.
I cursed the doctor and upset the brother,
Brushed past the conjurer, vowed that the first gust
Of stench from the ingredients just alight
Would raise a cross-grained devil in my sword,
Not easily laid; and ere an hour the prince
Slept as he never slept since prince he was."

In his childhood then, Paracelsus absorbed instruction in Latin, botany, alchemy, herbal medicine, surgery and religious history. There were influences at work, however, for which Dr. von Hohenheim was not responsible.

"Then first discovering my own aim's extent which sought to comprehend the works of God and God, himself, and all God's intercourse with the human mind."

And again, upon commencing his travels, of which more minute mention must be made, Paracelsus of the poem says:

"I go to prove my soul.
I see my way, as birds their trackless ways.
In some time, His good time, I shall arrive.
He guides me, and the bird."

Thus helping to shape this philosophy of life at so early an age, it must be remembered that it was an age of awakening in many respects. Printing was discovered; science was restudying its formulas and dogmas; theology was being reformed, etc.

In 1502 Dr. Wilhelm von Hohenheim was appointed town physician at Villach in Karinthia —and there he resided for thirty-two years.

In Villach there was a school founded by the Fuggers of Augsburg, owners of lead mines at Bleiberg. The school trained overseers and analysts to superintend the miners and analyse ores and metals. Here Paracelsus studied; and years later wrote:—"At Bleiberg is a wonderful lead ore which provides Germany, Pannonia, Turkey and Italy with lead; (A. Stoddart, Chap. II, page 32) at Hutenberg, iron-ore full of specifically fine steel and much alum ore, also vitriol ore of strong degree; gold ore at St. Paternion; also zinc ore, a very *rare* metal not found elsewhere in Europe . . . excellent cinnabar ore which is not without quicksilver and others. And so the mountains of Karinthia are like a strong box which when opened with a key reveals great treasure."

In this school the father taught; and young Theophrastus attended daily—and here attained considerable knowledge of chemistry, in which he attained such proficiency as to entitle him to be called the father of chemistry. He also had some training or preparation for high school or college probably at Basel. He also studied occultism with his father—occultism as previously mentioned being a sine qua non for the practice of medicine. There was no such thing as positive science—only a degenerate and stultified inheritance of dogma handed down from Greek and Roman physicians, and undergoing grotesque changes in meaning and significance through many translations from Greek to Latin —to Arabic and back again.

So debased were the resulting texts that the hypotheses of Hippocrates and Aristotle who wrote on all subjects from physics, anatomy, physiology, biology and the vital principles to sleep and dreams, were so obscured as to disturb logical thinking; and led to a wholesale condemnation of the entire system of thought as exemplified in Roger Bacon's "Opus Majus" wherein he declared that "if he could, he would burn all the works of the Stagyrite". Ibid.— Chap. II, page 36.

The result of all this chaos was the elevation to authority of Galen who had written five hundred treatises on philosophy, and dictated a system of medicine, fusing theory with practice and reducing all departments of knowledge "to authoritative assertion which prevailed over all Europe for twelve centuries, dissent from which was accounted sacrilegious".

When Paracelsus went to Basel, then, he was already steeped in the prevailing philosophies,

but with respect to medical lore he was determined to throw off the shackles of Galenical authority and go to nature for the solution.

From about 1510 he set forth to obtain real knowledge, and his first journey was to Wurzburg, where Trithemius, Abbot of Wurzburg had acquired distinction as a teacher of occult arts. But Paracelsus soon developed the feeling that the practice of necromancy in general was evil, and believed that, if there was any beneficent magic, it could be exercised only through or under the agency of God.

The urge to penetrate the secrets of nature was so strong that his wanderings commenced and led him to many countries, and association with all kinds of people preferably of the lowest or most lowly type.

In his travels he acted as Army Surgeon to several Princes in Denmark, Italy, and Belgium, journeyed in Portugal, Sweden and England, thence to Transylvania. He was carried, a prisoner, to Tartary and visited the college at Samarcand. From thence he went to Constantinople. Berdoe B. Cyclopedia—page 313.

It should be remembered that all this time was spent without reference to books. The book of nature was his only source of inspiration—and that faculty was cultivated in association with the common people. He sought the company of gipsies, vagabonds, tramps, shepherds and especially the elder country women versed in all kinds of herbalistic lore.

As showing Paracelsus' point of view, a quotation of his is appended:—"Faith is a luminous star that leads the honest seeker into the mysteries of Nature. You must seek your point of gravity in God, and put your trust into an honest, divine, sincere, pure and strong faith, and cling to it with your whole heart and sense and thought, full of love and confidence." Stoddart—Chap. III, page 56. If you possess such a faith, God will not withhold His Truth from you, but he "will reveal His works credibly, visibly and consolingly."

In the Poem:—

"How know I else such glorious fate my own
But in the restless, irresistible force
That works within me? Is it for human will
To institute such impulses? Be sure that God
Ne'er dooms to waste the strength He deigns impart."

About 1522 Paracelsus left Constantinople for Venice, where he acted as Army Surgeon in the war between the Emperor Charles V and Francis I, King of France, for possession of Naples. During the three years of duty he acquired more and more knowledge of both branches of his art, viz., medicine and surgery, and had probably taken degrees in both at Salerno. He attained great renown as a healer, and treated successfully many persons of high rank who had been considered incurable. Space will not allow of a minute description of his many cures. Suffice it to say that he was so successful with his new methods and practices as to incur the enmity of his brother practitioners, a motley crew of doctors, barbers, sorcerers and friars, who did their utmost to discredit his work. "It is a wonderful page in the history of scientific progress that tells of this brave man alone, delicate, poor, maintaining against all Europe the great personal research into Nature." Many times threatened he had to flee for his life. Ibid.—Chap. II.

The next important episode in Paracelsus' career was his connection with Basel University where through the influence of Oecolampadius, a well-known pastor, he was appointed to a lectureship on Medicine, and superiorship of Apothecaries.

It appears that at first the new lecturer met with great attention from his audience at the University, but it was not very long before the authorities interfered with Paracelsus, one reason being that he lectured in German, rather than the academical Latin.

These experiences are pictured in a graphic way by the Poet:—

"Just so long as I was pleased
To play off the mere antics of my art
Fantastic gambols leading to no end,
I got huge praise; but one can ne'er keep down
Our foolish nature's weakness. There they flocked
Poor devils, jostling, swearing and perspiring,
Till the walls rang again, and all for me!
I had a kindness for them which was right;
But then I stopped not till I tacked to that
A trust in them and a respect—a sort
Of sympathy for them; I must needs begin
To teach them not amaze them, 'to impart
The spirit which should investigate the search
Of truth', just what you bade me. I spoke out—
Forthwith a mighty squadron in disgust
Filed off—'the sifted chaff of the sack' I said,
Redoubling my endeavours to secure
The rest. When lo! one man had tarried so long
Only to ascertain if I supported
This tenet of his or that; another loved
To hear impartially before he judged
And having heard, now judged; this blank disciple
Passed for my dupe, but all along it seems
Spied error where his neighbours marvelled most.
. . . . . The end
Was a clear class-room and a quiet leer
From grave folk, and sour reproachful glance
From those in chief who, cap in hand, installed
The new professor scarce a year before;
And a vast flourish about patient merit
Obscured a while by flashy tricks, but sure
Sooner or later to emerge in splendour—
Of which the example was some luckless wight
Whom my arrival had discomfited,
But now it seems the general voice recalled,
To fill my chair and so efface the stain
Basel had long incurred. I sought no better
Only a quiet dismissal from my post,
And from my heart I wished them better suited
And better served. Good night to Basel then!
But fast as I proposed to rid the tribe
Of my obnoxious back I could not spare them
The pleasure of a parting kick!"

As Miss Stoddart remarks, however, this "parting kick" was "mild compared with the

chastisement of the deliberate indictments and invectives which he drew up for his preface to his 'Buch Paragranum.' The Basel of 1528 is pilloried in these to all time."

A sample of this latter work is appended:—"When I had made known the errors of medicine on no trivial grounds of guess-work but from close observation of many diseases, the doctors were highly incensed thereby" . . . especially "the ignorant crew who knew nothing of medicine, but who were stirred up to take part against me and to put me to open shame concerning my teaching."

Then again:—"Their worst contention against me is that I do not come out of their schools, nor write out of their erudition. Did I so write, how should I escape punishment for lying for the old writings are manifestly false." Again:—"I place the foundation of which I write upon four columns, Philosophy, Astronomy, Alchemy and Virtue." Also:—"And because I write from the true source of medicine I must be rejected, and you who are born neither of the true origin nor of the true heredity must adhere to the spurious art which raises itself beside the true."

"Only the abandoned academic Bacchantes who bear the name of doctor must suffer no deposition. They abide painted doctors."

With these few extracts from the Paragranum, the flaming outburst of indignant exhortation, which has been quoted more frequently than any other words of Paracelsus as showing his bombastic and arrogant attitude, may well be re-quoted—and, incidentally better understood. Ibid.—Chap. VII, pages 142-143.

"Follow after me, Avicennes. Galen, Rhases, Montagnana, follow you me and not I you. Ye from Paris, from Montpellier, from Wirtemberg, from Meissen, from Cologne, from Vienna, from the Danube, the Rhine, and the islands of the sea; Italy, Dalmatia, Sarmatia, Greek, Arab, Israelite, follow you me and not I you; of you will no one survive, not even in the most distant corner. I shall be monarch and mine will be the monarchy which shall bind all your countries" and more to this effect.

Paracelsus knew he was right, that his light came from:—"God's lamp whose splendour soon or late should pierce the gloom."

He takes his brethren to task for their ignorance of fundamentals; specifically in treating anthrax and the pestilence; for indifferent diagnosis, and especially a study of the pulse as an index of disease; and so he goes on—as B. writes:—"I will fight the battle out; a little spent perhaps, but still an able combatant." He journeyed from city to city in the vain hope of finding an abiding place. Time and again it seemed as if he had accomplished his desire; but some spectacular cure of a local nabob would set up antagonism with his confreres and away he would go once more. When Paracelsus left Basel, he left behind most of his belongings except perhaps his most precious drugs—for instance his store of laudanum, the source of his most noteworthy cures.

It seems that he had one attendant—Oporinus, whom he thought to be sincere, but who played false; and in fact admitted his duplicity on his deathbed. Oporinus was probably the means of providing the enemies of Paracelsus, writing under the name of Erastus, with data for their calumnies.

In the meantime and under the most unfavourable auspices, Paracelsus was constantly writing and it would require a separate essay or book to deal adequately with the voluminous compositions credited to Paracelsus' pen.

In 1541, after visiting—during the previous two years—Augsburg and Munich; Gratz, Breslau and Vienna, he commenced his final journey which terminated in Salzburg where he died in 1541.

Various accounts of his death have been given—one that the doctors of Salzburg had hired a killer to club him to death, and a mark on his skull when exhumed later, would seem to substantiate this hypothesis at that time.

The researches of Dr. C. Aberle, however, point to the fact that Paracelsus was the victim of an insidious disease, not unconnected with his work in distillation of poisonous substances, viz., "antimony, mercury, opium, nightshade, monkshood" and others. "What is certain is that day by day the subtle disease progressed and that he braced himself to meet the invincible master whom it heralded."

For so long as possible—some weeks—he paid professional visits to the sick, studied in his workroom, which was fitted up as a chemical laboratory.

Three days before his death, Paracelsus made his last Will and Testament concerning property of his in various places and consisting mainly of books and manuscripts. He had no fear of death. Death was his "day's work ended and God's harvest time. Man's power over us ends at death and only God deals with us then and God is love."

The end came on September 24, 1541.

As Browning writes:—

. . . . . "If I stoop
Into a dark tremendous sea of cloud
It is but for a time; I press God's lamp
Close to my breast; its splendour soon or late
Will pierce the gloom; I shall emerge one day."
"And this was Paracelsus."

DR. CHARLES F. PAINTER:

It was indeed a fortuitous circumstance that our program this evening should have included both Paracelsus and Darwin. Two years ago, we listened to a most interesting sketch of Paracelsus' strange career written by Dr. Fred Lund. He, Paracelsus, was much in advance of his time, as much so as Luther, Erasmus, Melancthon and many reformers in other fields of

human activity. Because of that fact, he has been credited with many attributes which, viewed in the light of our present knowledge, mollify to a considerable extent the harshness of much of the criticism meted out to him in the past. Without any desire to anticipate what Dr. Quinby may have to say to us, I wish to point out how Paracelsus seems to have had a prevision of what Darwin undertook to prove from a somewhat different angle. The following quotations from Paracelsus are, therefore, not to be regarded as a discussion of Dr. Quinby's paper, which would be out of order, but merely as throwing light upon the parallelism of human thought in two clear thinking individuals, separated in time by nearly 400 years, whose mental processes were along widely separated paths. *"He looked," says Hartman, "upon the continually evolving forms as necessary vehicles of a continually, progressive, living principle, thus differing from some of our modern philosophers who look upon life as a manifestation of physical and chemical activity of dead matter, in an uncomprehensible, causeless development." All things, Paracelsus taught, "come from the same source containing the primordial substance of things; and they are all intimately related with each other and are essentially a Unity. Man as such is the highest being in existence because in him Nature has reached the culmination of her evolutionary efforts, in him are contained all the substances that exist in the world. In him wisdom may become manifest. It is a great truth which you should seriously consider that there is nothing in Heaven or upon the earth which does not exist in man, and the two are one."

It may be urged that Paracelsus did not contribute anything to medicine. It might be similarly urged in the case of Luther in respect to theology, for the contributions of the two men were not far different in their respective fields. They both called a halt to the prevailing forces of their time and where those forces were on the wrong path it was certainly a contribution to turn them back toward the truth. The following two quotations reflect in the first the spirit of the man, in what might be said to be his creed, and the second a declaration of the purpose of his teaching. "We must put the fundament and corner stone of life on three principal points. 1st. Prayer; which is the strong desire and aspiration for that which is good; 2nd. Faith: not blind, but based on knowledge, as unswerving confidence that may remove mountains, even as Christ said; 3rd. Imagination: that power properly kindled in the soul, we will have no difficulty in harmonizing it with our faith. A person sunk deep in thought is like one bereft of his senses, and the world looks on him as a fool, but in the consciousness of the Supreme he is wise; he is the confidential friend of God, because he can reach God through his own soul; Christ through faith, and the Holy Ghost through an exalted imagination. In this way we may grow to be like the Apostles, and to fear neither death nor prison, nor suffering, nor torture, nor anything else."

The following letter was placarded on the door of the University of Basle when Paracelsus went there to begin his lectures. "Theophrastus Bombast Von Hohenheim, a hermetic doctor and professor of both medicines. Whereas, of all disciples, medicine only as being a certain divine gift, is praised with the honorable title and name of necessity, by the testimony of sacred writ and profane also. We intend to purge and cleanse it from the barbarous and grievous errors now successfully exercising it. We do not bind ourselves to any precepts of the ancients, but such as are evidently true. For who knows not that most of the doctors of this age have grossly erred to the exceeding hazard of the sick, in obstinately adhering to the sayings of Hippocrates, Galen, Avicenna, just as if they had been so many tripods or oracles from which it is unlawful to depart a finger's breadth. These authors make us brave doctors, but not physicians. For it is not title, nor eloquence, nor reading, nor many books, (though these things are ornaments) that make physicians, but an excellent and deep knowledge of things mysterious which is worth all the rest. The rhetorician learns to speak eloquently and persuade the judge, but the physician knows the kinds, the causes and the symptoms of affairs, and by piercing sight and industry to administer medicines rightly, and to heal who can be healed. Know then that I, being invited by the large stipend of Basle, do for two hours spare daily, publicly interpret, with accurate diligence my books, both of active and inspective medicine, to the great profit and advantage of my hearers. Wherefore, honest readers, if the mysteries of this apollinean art are delightful enough to any of you, and you covet thoroughly to learn in a short time, whatever pertains to this discipline, come to us at once at Basle, and you shall find other and greater things than I can describe in these few lines. But that my intention may appear more clearly to the studious, I am not ashamed to say that we do not agree with the ancients in attributing all diseases to complexions and humors, for that is an error which has prevented doctors from reaching the truths as to diseases in their days. Let this as shown through a lattice suffice for today, but do not decide rashly till ye have heard Theophrastus. Fare ye well and take in good part, this our effort toward reformation in medicine." MDXXVII June, Basle.

Our second paper is by Dr. Spector who paid a visit to Down House this summer and has something interesting to tell us, as well as to

*Hartman—quoted by Mrs. Holy.

show us, in regard to Charles Darwin. If you have not read any account of the life of this great naturalist I would commend to you the biography by his son and as an interpretation of Darwin as a man, more particularly than as a scientist, I would refer to Gamaliel Bradford's very readable volume. To really get to the secret of his great accomplishments, however, one must take up some of his works, such as the Voyage of the Beagle, the Descent of Man and certain of the shorter and more specialized studies. At the time of his death, in 1882, there was probably no scientist whose work had entitled him to greater respect than had Darwin's. There was certainly none that had been a more painstaking performance and no one whose mind had been kept more open to conviction. Twenty years did he delay the publication of his investigations and, even when he had taken that step and the storm of criticism that was provoked had broken all about him, he did not regard the main contentions as sufficiently proved but continued to experiment and make additional observations and comparisons, the more to strengthen the positions he had taken. He constantly kept a check on the inclination every man experiences to regard as established that which his preconceived ideas have led him to believe to be the truth. He frequently gave expression to doubt regarding his own ability to think clearly and logically. He credited himself with a capacity for accurate and close observation, over and above such powers in the average man, but he was not equally confident of his ability to make sound deductions. In the course of time he was led to modify to some extent his earlier conclusions, bringing himself to recognize the validity of certain criticisms made upon his evolutionary theories by those who most bitterly opposed his views. When one considers the burden of invalidism with which he had to contend all his working days, his accomplishments seem all the more remarkable. Rarely was he able to work consecutively more than three or four hours. Most of his afternoons and evenings were devoted to rest or recreations of an extremely passive sort. He was read or played to, but animated conversation could not long be indulged in without bringing on the discomforts of nervous indigestion, totally incapacitating him. He was fortunately in a position where he was not disturbed by anxiety over financial matters. He had sufficient resources to enable him to provide the comforts which his family of ten children had been brought up to enjoy and was generous in providing for all their necessities. He was always ready to assist those who were in need of help in the prosecution of scientific work and many there were who profited by his liberality. He was kindly, approachable, even tempered and singularly free from that kind of irritability that so frequently characterizes those who have to endure the physical handicap from which he suffered. For the most part he was well disposed toward those who differed with him, having that humility which is manifested by the truly great. In conversation he was a good listener and sought always to draw out the best in those with whom he conversed.

In our day, the repercussion of the revolutionary upset precipitated by promulgation of Darwin's theories upon the religious beliefs so strongly held by many of his contemporaries, is seen in the attitude of the fundamentalists to the doctrines of evolution. It is their contention that a faith, though unsupported by facts, is better for mankind than the theories of the evolutionists and consequently they would have us discard the entire body of facts to which, in the main, the scientific world has given its assent. It is worthy of note, however, that so far as Darwin himself was concerned, delving in mysteries dealing with the origin and progression of life on this planet developed in his character the very qualities which Christianity has held as ideals most desirable for mankind to acquire, viz., humility, tolerance, self-abnegation and the willingness to place oneself in another's position in order to better understand that person's feelings and reactions. If the search for scientific truth can achieve such results for the individual there must be virtue in it, quite as valuable as in the blind faith that coerces acceptance of beliefs that are no longer tenable in the light of present-day knowledge. Religion in the future is pretty certain to concern itself more with socialized ethics than with the mere attainment of individual perfection in character. Many modern scientists notably, Conklin, Mivart, Sir Oliver Lodge, and many others, see no insuperable obstacles in the way of reconciling the truths of Science with the hopes of religionists.

To the man of Science there is something akin to reverence that grips him when he visits the scenes in which epoch-making events in the history of Science have taken place. Such localities, otherwise commonplace enough, take on the nature of a shrine and one who experiences these feelings when introduced to such an environment may well liken his sensations to those of a religious devotee in the abode of St. Francis of Assisi or some other saintly character. It is in recognition of the value of contacts of this kind that the preservation of the homes and workshops of those who have clarified human knowledge owe their existence. It is for this reason that Sir Buxton Browne's benefaction in providing for the preservation of Darwin's home at Down is so munificent a gift. In such surroundings one gleans a knowledge of the man behind the work which humanizes it and imparts to it a substance that glosses over the cold facts of Science. This feeling was well portrayed by Dr. Spector in his account of a visit to Darwin's home this summer and any one who heard it must have felt some, at least, of the uplift that attaches to such an experience

and impels him to seek for himself such a stimulus.

It is appropriate that we should at this time take account of the fact that one whom we were all glad to see will meet with us no more. Dr. Lund has already written and published an appreciation of our friend and associate and I shall do nothing more than try to voice our sense of loss as a club. The Society has been deprived, through the death of Edward Wyllys Taylor, of one of our most interested members, one, who not only by his regular attendance but by his participation in our discussions, never failed to throw some interesting side lights upon the subjects under consideration. He has served the Club as its President, and as a member of its executive council for a number of years. We shall miss his kindly presence as well as his good advice and thoughtful contributions to the Proceedings of the Society. Although his particular interest was in the field of neurology his outlook on medicine was broad and his familiarity with matters outside the limits of his specialty always assured from him an intelligent discussion of the varied topics presented for the entertainment and instruction of the Club. No better illustration could be afforded—if such were needed—of the value of maintaining a continued interest in the currents of medical thought as they have borne on their surface the sound and the unsound, the practical and the theoretical contributions thrown upon an ever-widening stream of professional achievement. Our times need more of this sort of man and I like to think that it is this type of society where opportunity for the display of such characteristics as distinguished our friend may come to their finest fruition. It is in no small measure that such success as this Club has achieved may be ascribed to Dr. Taylor's sustained interest in its welfare, and we honor his memory, when in this public way, we acknowledge our debt to him.

MISCELLANY

APPOINTMENT OF DR. JAMES V. MAY

In order to fill the position made vacant by the death of Dr. Kline, the Governor nominated and the council approved the appointment of Dr. James Vance May, Superintendent of the Boston State Hospital, to the position of Commissioner of Mental Diseases, Commonwealth of Massachusetts. This appointment indicates the purpose of the Governor to maintain the high standards which have characterized the administration of this department, because Dr. May has had a long experience and has demonstrated unusual capacity in dealing with the problems involved in caring for the mentally ill.

His early appointment in State service, under the then Governor Calvin Coolidge, was to the superintendency of one of the State hospitals. In 1916 and part of 1917 he was Superintendent of the Grafton State Hospital and from 1917 to the date of his present appointment was Superintendent of the Boston State Hospital. Dr. May qualified for office as Commissioner January 12 and thus became custodian of one of the most important State departments. The annual appropriation for this department is in excess of $11,000,000. Dr. May was selected by the Governor from a group of several candidates.

Dr. May came to Massachusetts on the recommendation of Dr. L. Vernon Briggs, founder of the Massachusetts system of care for the mentally ill. He has established a reputation both as a writer and through his application of modern theories in the treatment of the mentally diseased. The scope of work which he has now assumed will be the charge of sixteen hospitals and more than 20,000 patients. Dr. May's interest in the personal contact with patients led him, at first, to feel that he wished to continue in his position at the Boston State Hospital, where he was an able administrator. He is an exponent of disciplinary administration founded partly on his military training in the World War. From 1911 to 1917 he was, successively, first lieutenant, captain and major in the Medical Reserve Corps, U. S. Army.

Dr. May was born at Lawrence, Kansas, July 6, 1873. He graduated from the University of Kansas in 1894 and received his M.D. from the University of Pennsylvania in 1897. He was first assistant physician at the State Hospital at Binghamton, N. Y., and then medical superintendent of the New York State Hospital at Matteawan. From 1911 to 1916 he was medical member and chairman of the New York State Hospital Commission.

Dr. May's association with scientific bodies is extensive. He is a member of the American Medical Association, the American Psychiatric Association of which he is now President, the Massachusetts Psychiatric Society of which he was President in 1927-1928 and a corresponding member of the Royal Medical-Psychiatric Association of England. He is a member of the council of the national and international committee for mental hygiene and a member of the National Conference on Nomenclature of Disease.

CORRESPONDENCE

THE VALUE OF DIPHTHERIA TOXOID AS AN IMMUNIZING AGENT AGAINST DIPHTHERIA

The Commonwealth of Massachusetts
Department of Public Health
Boston, Mass.

January 5, 1933.

Editor, The *New England Journal of Medicine*,

After several years of study at the State Antitoxin and Vaccine Laboratory of the value of

diphtheria toxoid as an immunizing agent against diphtheria, this Department is now prepared to distribute this product, upon special request, to physicians of the Commonwealth.

Our recommendations concerning its use are as follows:

Diphtheria toxoid is recommended for the active immunization against diphtheria of children over six months but not over six years old. If employed in the usual doses in persons above this age, unpleasant reactions may be encountered.

Dosage. Three doses are recommended, to be given with an interval of three to four weeks between them. *The first dose is 0.5 cc.,* the other two are 1.0 cc. each. The use of less than three doses or of intervals less than three weeks is not recommended because of the smaller proportion of individuals immunized and the lower grade of immunity obtained. Injections should be made subcutaneously. *Do not inject more than 1.0 cc.*

Reactions. Local and even general reactions may occur following the administration of diphtheria toxoid. These are exceptional in children under six years of age but are more common in children of older age groups. The reactions consist of varying degrees of redness, induration and swelling at the site of injection, sometimes accompanied by malaise, fever, and headache, which usually disappear within two days.

Immunity. Immunity of the level indicated by a negative Schick test develops somewhat earlier after the use of diphtheria toxoid than after the use of diphtheria toxin-antitoxin mixture. Therefore, the Schick test to determine immunity should be done not earlier than three months but should always be done between this date and six months after the administration of the last dose of diphtheria toxoid.

Inasmuch as this product is to be used largely for the immunization of children of preschool age, and since it is hoped that many of the immunizations will be done in private practice, it will be supplied in one cubic centimeter ampoules.

Any additional information concerning the preparation and use of diphtheria toxoid will be furnished upon request to the Director, Division of Communicable Diseases, Department of Public Health, State House, Boston, Mass., (telephone Capitol 4600) or the Director, Division of Biologic Laboratories, Antitoxin and Vaccine Laboratory, 375 South Street, Jamaica Plain Station, Boston, Mass., (telephone Jamaica 4127).

Orders for this and biologic and arsenical products should be sent to the Antitoxin and Vaccine Laboratory, 375 South Street, Jamaica Plain Station, Boston, Mass., (telephone Jamaica 5672).

Yours truly,

GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

AN APPROVAL OF THE WORK OF THE COMMITTEE ON THE COSTS OF MEDICAL CARE

January 12, 1933.

Editor,
New England Journal of Medicine,

Dear Mr. Editor:

I have read carefully the recommendations of both the majority and minority reports of the Committee on the Costs of Medical Care. I have also read the editorial comments thereon in both your *Journal* and that of the American Medical Association. I write to offer you my heartiest congratulations on the tolerant, dignified and courageous manner in which you have stated your views. It stands in marked contrast to the flippant defence of stand pat-ism put forth by the editor of the *American Medical Association Journal.*

No one who thinks at all, least of all the members of the Committee, will consider the majority report as the last word on the solution of the problems of medical practice, nor will anyone who thinks at all claim that the methods for dispensing medical care to the American people, which the profession has thus far developed, have reached perfection. The majority report represents a sincere and intelligent effort to find ways by which progress can be made. It claims to have found no panacea. Rather, in truly scientific spirit, it invites experiment. As such it is entitled to serious consideration by the profession's national journal. Instead it gets from that quarter a line of cheap and witless sarcasm which advances the problems not at all and indicates merely that there is a closed mind at A. M. A. headquarters. I heartily agree with your correspondent Dr. Haigh that what we need is a totally new leadership there.

Sincerely yours,
J. H. MEANS.

RECENT DEATHS

DELAYED NOTICE

WATSON — FRANK GILMAN WATSON, M.D., of 11 Virginia Street, Dorchester, died January 13, 1932, aged 58 years and ten months. Dr. Watson received his M.D. degree from the Medical School of Harvard University in 1898 and he joined the Massachusetts Medical Society in 1899.

AVERELL—CHARLES WILSON AVERELL, M.D., died in Akron, Ohio, December 17, 1932. Dr. Averell formerly practiced in North Reading, Massachusetts. He joined the Massachusetts Medical Society in 1903 after graduating from the Tufts College Medical School. He removed to Akron in 1920 and resigned from the Massachusetts Medical Society that same year. He was a quiet reserved gentleman with a keen sense of humor and was respected by his associates.

DAVIS — GEORGE RUFUS DAVIS, M.D., of Marlborough, Massachusetts, died in Worcester, Massa-

chusetts, December 26, 1932, aged 52. He graduated from the University of Vermont Medical College in 1908 and joined the Massachusetts Medical Society in 1915.

CALDERWOOD—Dr. Samuel Herbert Calderwood died at his home in Roxbury, Massachusetts, January 13, 1933, after several weeks of illness.

Dr. Calderwood was born in Morrill, Maine, January 13, 1855. His medical education was acquired through courses at Bowdoin, Dartmouth and Boston University, graduating from the Medical School of Boston University in 1875. He practiced in Waldoboro, Maine, for seven years before coming to Boston in 1882. He early established a reputation as a skillful and devoted physician and a public-spirited citizen.

His standing in the profession led to his appointment on the Massachusetts State Board of Registration in Medicine where he gave devoted service from 1895 for the following twenty-seven years, occupying the chairmanship for many years.

Dr. Calderwood was deeply interested in civic affairs and served on the Boston School Committee from 1894 to 1901. He was a member of the American Medical Association, the Massachusetts Homeopathic Medical Society and the Massachusetts Medical Society.

He was an uncompromising opponent of dishonesty and pretense both in private and public life.

In 1877 Dr. Calderwood married Miss Laura Howes Tupper who, with their son, Dr. Edward S. Calderwood, survives him.

MORRISON—Lawrie Byron Morrison, M.D., died at his home in Brookline, Mass., January 16, 1933, aged 57.

Dr. Morrison was born in Barnet, Vermont, October 17, 1875. His premedical education was at Peacham Academy, Vermont and he received his M.D. degree from the University of Vermont Medical School in 1902. He became interested in x-ray work while serving as assistant superintendent and medical director of the Mary Fletcher Hospital in Burlington, Vermont. He took postgraduate work at Philadelphia and Montreal and became instructor at his medical Alma Mater. He came to Boston in 1914 to work with Dr. Walter Dodd and later with Dr. George Holmes for a short time. He opened his private laboratory on Marlborough Street soon after. His experience followed that of Dr. Dodd, both being victims of long exposure to the roentgen rays.

Dr. Morrison was a member of the Massachusetts Medical Society, the American Medical Association and several scientific bodies interested especially in radiology.

Besides his widow he leaves a son.

This brief notice marks the passing of another martyr to a science, the application of which was rendered to humanity.

CAHILL—John William Cahill, M.D., died at St. Vincent Hospital, Worcester January 15 after an illness of one week.

Dr. Cahill was graduated from Holy Cross College in 1903 and from the Medical School of Harvard University in 1907.

He joined the Massachusetts Medical Society in 1910 and was a Fellow of the American Medical Association. During the World War he served in the medical corps with the rank of Captain and was attached to the twelfth division at Camp Devens. Dr. Cahill was a specialist in eye, ear and throat work and had achieved distinction in this field.

He was a member of the Staff of St. Vincent Hospital and Memorial Hospital. He was a Knight of Columbus and a director of the Worcester Public Library.

He is survived by his mother, Mrs. Katherine A. Cahill, and a brother, Dr. Harry P. Cahill, Instructor in Otology, Harvard Medical School.

STRICKLAND—Samuel Perley Strickland, M.D., died at his home 756 Moody Street, Waltham January 15, 1933. He was born in Livermore, Maine in 1870 and received his M.D. degree from the Dartmouth Medical School in 1891.

Dr. Strickland was a Mason, a member of Sir Galahad commandery, Knights Templar and the Odd Fellows. He leaves a widow and three sons.

NOTICES

CLINICS IN MEDICINE AT PETER BENT BRIGHAM HOSPITAL

On Thursdays at 3:30 P.M. in the Amphitheatre of the Peter Bent Brigham Hospital Dr. Henry A. Christian, Hersey Professor of the Theory and Practice of Physic, Harvard, and Physician-in-Chief, Peter Bent Brigham Hospital, will give a series of clinics which members of the medical profession are cordially invited to attend. The next clinic will be given on January 26.

Physicians and medical students are also invited to attend ward rounds of the Medical Staff of the Peter Bent Brigham Hospital held from 10-12 o'clock on Saturdays, as well as a clinical-pathological demonstration immediately following these rounds.

ANNOUNCEMENT

Dr. Arnold Starr announces the opening of an office at the Lister Building, 475 Commonwealth Avenue, Boston.

AN ENDORSEMENT OF THE DRIVE FOR FIVE MILLION DOLLARS

The Suffolk District Medical Society which is composed largely of physicians practicing in

Greater Boston heartily approves of the drive for $5,000,000. starting on January 16 for the maintenance of the Social Agencies of Boston. The doctors have already done a great deal for the care of the unfortunate sick in hospitals and private practice, and they are willing to do their utmost in helping such patients to meet their difficulties as easily as possible.

WILLIAM H. ROBEY, M.D., *President,*
LELAND S. MCKITTRICK, M.D., *Secretary.*

AWARD

The New England Society of Psychiatry, at its next Spring meeting, will make two awards, one of $100.00 and one of $50.00, to the writer (or writers) of the best papers completed or published during the calendar year of 1932 embodying *research in psychiatry* by a younger worker (or workers). Physicians, psychologists, social workers, or others are eligible. Membership in the Society is not a requisite.

Writers who have once received an Award are not again eligible. Seasoned writers, senior physicians, or heads of departments in which there are junior workers, while not inevitably excluded, will not generally be regarded as eligible for the Awards.

The work on which the papers are based should preferably have been done in New England or by workers now living in New England.

The papers will be examined by a Committee of three members who are accustomed to reviewing papers, and by the Executive Committee of the Society. They will be judged on the basis of their scientific quality.

Copies of articles or marked copies of journals in which the articles appeared should be sent before February 1, 1933, to the Secretary of the Society.

Superintendents of institutions, public or private, for the care of mental patients in New England are requested to post this notice and to send to the Secretary a list of such papers published by the staff members as appear to be entitled to be considered for the Awards.

HARLAN L. PAINE, M.D., *Secretary.*
North Grafton, Mass.

COÖPERATION IN THE STUDY OF THE EPIDEMIOLOGY OF PNEUMONIA

To the Medical Profession:

The Harvard School of Public Health in conjunction with the Commonwealth Fund of New York City and the Massachusetts State Department of Public Health is conducting a study of the epidemiology of lobar pneumonia and is anxious to be informed of any localized outbreaks. Two or more cases occurring in one family are of particular interest.

It would be greatly appreciated if physicians experiencing any unusual incidence of lobar pneumonias in their practices would call Dr. F. S. Leeder at the Harvard School of Public Health —Telephone number, Longwood 2380.

HARVARD UNIVERSITY

FREE PUBLIC LECTURES ON MEDICAL SUBJECTS

The Faculty of Medicine of Harvard University offers a course of free public lectures on medical subjects, to be given at the Medical School, Longwood Avenue, Boston, on Sunday afternoons, beginning January 8 and ending March 26, 1933. The lectures will begin at four o'clock and the doors will be closed at five minutes past the hour. No tickets are required.

SUNDAY AFTERNOONS AT FOUR O'CLOCK

January 22—Dr. G. H. Bigelow: The Depression and Health.

January 29—Dr. W. B. Lancaster: Sparing the Eyes.

February 5—Dr. G. P. Grabfield: Rheumatism.

February 12—Dr. G. H. Wright: Color Changes in the Mouth and Teeth: an Aid in Diagnosis of Systemic Disease.

February 19—Dr. W. H. Robey: Let the Head Govern the Heart.

February 26—Dr. H. R. Viets: Nerve, Nerves, and Nervousness.

March 5—Dr. E. L. Oliver: The Care of the Skin and Scalp.

March 12—Dr. Shields Warren: Cancer and Radiation Therapy.

March 19—Dr. Randall Clifford: The Tuberculosis Problem Today.

March 26—Dr. W. G. Smillie: A Discussion of the Common Cold.

REPORTS AND NOTICES OF MEETINGS

NEW ENGLAND PHYSICAL THERAPY SOCIETY

The regular meeting of the New England Physical Therapy Society was held in the Music Room of the Boston Square and Compass Club, 448 Beacon Street, Boston, at 8 P.M., December 14, 1932. Dr. Charles W. McClure was the program chairman. The subject for the evening discussion was "A Region of Diagnostic Romance, the Stomach, Liver and Pancreas."

Dr. C. F. Branch first spoke of certain pathological conditions in these organs which have interested him. One of these is the frequency with which one finds old or fresh blood in the gastro-intestinal tract at the autopsy table when there has been a failure to diagnose a hemorrhage clinically. Re-

cently he has had a number of such cases; in each, the pathologist attempted to explain the source of the hemorrhage. If there is a peptic ulcer with an eroded vessel running across the base, the explanation is quite simple. But oftentimes the bleeding point cannot be found despite a careful search. With cardiac decompensation and cirrhosis of the liver, one frequently finds blood in the gastro-intestinal tract after death without a clinical diagnosis.

Regarding pancreatitis, Dr. Branch stated that there are two possible causes of this condition. (1) Regurgitation of duodenal contents into the ampulla and thence up the pancreatic ducts, but this is impossible as shown by experiments that produce a tremendous positive pressure in the duodenum without causing a backward flow. (2) Damming back of bile into the pancreatic ducts is a more probable cause. Bile produces necrosis when injected into the ducts of the pancreas, and it is thought that repeated insults of this nature give rise to the picture of chronic pancreatitis. Acute pancreatitis is an unusually severe reaction from a similar cause.

In his remarks on cholecystitis, Dr. Branch stated that 90 per cent of cases are bacterial in origin. In 50 per cent of cases of cholecystitis we find stones, but 99.4 per cent of stones are found in people suffering with cholecystitis. One of the explanations for this is that the gallbladder concentrates the bile. In microscopic sections of the gallbladder in cholecystitis with cholelithiasis, one frequently sees cholesterin crystals in the villi. These are not absorbed because of the blockage of the lymphatics from inflammation. The walls of the villi undergo necrosis, the cholesterin crystals enter the gallbladder lumen and there form the nucleus for further precipitation of bile elements.

The speaker went on to explain the mechanism of hemorrhage and ascites in cirrhosis of the liver. Cirrhosis always means fibrosis. The liver is one of the richest capillary beds in the body, and, when these two conditions exist simultaneously, it means an inevitable damming back of blood with its ensuing consequences.

Dr. Lee MacPhee next spoke of some of the tests that are used in evaluating liver function. Mention was made of the icteric index, Van den Bergh reaction, the galactose tolerance test and duodenal tube drainage. In regard to duodenal drainage the speaker stated that certain substances such as magnesium sulphate and hydrochloric acid stimulate both quantitative and qualitative production of bile, while peptones and other substances stimulate only volume production of bile. The liver is stimulated to activity by endogenous, exogenous and intrahepatic substances. All of these factors have to be considered in evaluating the duodenal drainage and the response that follows stimulation of the liver.

Dr. MacPhee showed x-ray films portraying a method of palpating the gallbladder under the fluoroscope, emptying it, and obtaining a view of the walls of the viscus.

Dr. Charles W. McClure discussed gastric ulcer and the various forms in which it may manifest itself. (1) The benign form of ulcer often gives a history of pain from one to two hours after meals. If the patient is treated medically he may remain well and the symptoms subside. (2) Another patient may complain of the same symptoms as the first, but under medical treatment his ulcer undergoes remissions and exacerbations with a final termination in carcinoma. (3) These patients never improve under a medical régime, and malignancy exists from the beginning. These three classes demand a differential diagnosis. It is well to consider that every patient with gastric ulcer may have cancer. These cases should be given ulcer management at first, and if the x-ray crater diminishes in size it may be assumed to be a benign lesion, while if it increases or remains stationary, it is usually cancer.

(4) This class of patients complains of ulcer symptoms but evidences no deformity in the x-ray films. The absence of such findings does not exclude the presence of gastric ulcer, and the patients recover under a dietary régime. (5) One frequently finds that an ulcer patient has been the victim of migraine which does not improve on ulcer management although the gastric symptoms disappear. (6) Occasionally one finds an ulcer with periodic vomiting and sometimes distress or pain. Here vomiting takes the place of pain. One sometimes sees a sudden hemorrhage as the first sign of ulcer, or again an ulcer may perforate without previous manifestation of symptoms.

In discussing the treatment of this condition, Dr. McClure stated that cellulose, uncooked juices and bulky food should be excluded from the diet.

The speaker next mentioned duodenal drainage as valuable in excluding a diagnosis of carcinoma of the head of the pancreas. Magnesium sulphate introduced through the tube will not usually bring a response of bile if carcinoma of the pancreas is present. A laboratory analysis of the pancreatic juices found in the duodenal contents is also valuable in the diagnosis of this condition.

Dr. McClure illustrated his remarks with lantern slides.

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

The Essex South District Medical Society held its regular meeting at Danvers State Hospital on January 4, 1933.

Members had an opportunity of visiting the wards, after which the following program was presented:

1. Some Observations on Neurosyphilis. Dr. Charles C. Joyce, Pathologist.

2. Dementia Praecox: Diagnosis of Types. Dr. Solomon Gagnon, Senior Physician, Male service.

Following the clinical program, members enjoyed

dinner as the guests of Dr. C. A. Bonner, Superintendent of the hospital.

The speaker of the evening was Dr. A. Warren Stearns, Commissioner of Corrections and Dean of Tufts College Medical School, who addressed the society upon sociology.

WM. T. HOPKINS, *Reporter.*

HAMPDEN DISTRICT MEDICAL SOCIETY

The regular winter meeting of the Society will be held in the rooms of the Springfield Academy of Medicine, 20 Maple Street, Springfield, on Tuesday, January 24, at 4:15 P.M.

Papers for the afternoon:

Lung Cavities—Their Control a Necessity to the Arrest of the Disease. Treatment by Various Methods. Lantern Slides. Dr. H. W. Van Allen.

The Clinical Use of Diuretics. Dr. Herrman L. Blumgart, Assistant Professor of Medicine, Harvard Medical School.

Dr. George D. Henderson will open the discussion.

Supper at 6 P.M. at expense of Society.

HERVEY L. SMITH, M.D., *Secretary.*

THE NORFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the society will be held in the Roxbury Masonic Temple, 171 Warren Street, Roxbury, on Tuesday, January 31, at 8 P.M. Tel. Garrison 9492.

Business:

Communication: Stomach Surgery—Illustrated by motion pictures. Dr. William R. Morrison. Discussion.

Collation.

FRANK S. CRUICKSHANK, M.D., *Secretary.*
1694 Beacon Street, Brookline.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Van Dyke Street entrance), Tuesday evening, January 24, at 8:15 o'clock.

PROGRAM

Presentation of Cases.

Studies of Gall Bladder Function. By Dr. I. S. Ravdin, of Philadelphia.

JOHN HOMANS, M.D., *Secretary.*

BOSTON CITY HOSPITAL

Staff Clinical Meeting
Tuesday, January 31, 1933, at 8:15 P.M.
Cheever Amphitheatre

Intracranial Mastoid Complications. Drs. Harry P. Cahill and Chester R. Mills.

Complications of Nasal Accessory Sinus Disease. Dr. Louis M. Freedman.

New Growths of the Nose and Throat. Drs. Harry P. Cahill, Louis M. Freedman, Edward J. Monahan.

Bronchoscopic Observations of Lung Complications. Dr. Louis M. Freedman.

Cataract (mature) Bilateral. Epidermoid Carcinoma of eyelids, nose and cheek (orbital complications). Treatment by Radium. Dr. Jeremiah J. Corbett.

Neuropathic Keratitis. Dr. Robert W. French.

Enucleations. Dr. Robert W. French.

Glaucoma. Dr. Harry Schwartzman.

COMMITTEE ON HOSPITAL CLINICS.

THE NEW ENGLAND DERMATOLOGICAL SOCIETY

The regular quarterly clinical meeting of the New England Dermatological Society will be held on Wednesday, February 8 at the Massachusetts General Hospital at three o'clock in the afternoon.

WM. P. BOARDMAN, *Secretary.*

LAWRENCE MEDICAL CLUB

Z. William Colson, M.D., of Methuen, Mass., and the undersigned are hosts of the Lawrence Medical Club at the Medical Library of the Lawrence General Hospital, 1 Garden Street, Lawrence, Mass., on the occasion of its regular monthly meeting on Monday, January 23, 1933, at 8:30 P.M. *sharp.*

The speaker is W. P. Bowers, M.D., of Clinton, Mass., Managing Editor of the *New England Journal of Medicine*, and his subject is a "Discussion of the Report of the Committee on the Costs of Medical Care."

Lunch will be served.

J. FORREST BURNHAM, M.D.

SOCIETY MEETINGS
CONGRESSES AND CONFERENCES

January 22 - March 26—Harvard University. Free Public Lectures on Medical Subjects. See page 172.

January 23—Lawrence Medical Club. See notice above.

January 24—Harvard Medical Society. See notice elsewhere on this page.

January 25—Boston Medical Library in conjunction with the Suffolk District Medical Society. See notice on page 109, issue of January 12.

January 26—New England Hospital for Women and Children. See notice on page 109, issue of January 12.

January 26—Clinics in Medicine at Peter Bent Brigham Hospital. See page 171.

January 31—Boston City Hospital. See notice elsewhere on this page.

February 6-10—The American College of Physicians. See page 765, issue of October 27.

February 8—The New England Dermatological Society. See notice above.

February 8 - April 5—The New England Heart Association. See page 1011, issue of December 1.

February 10 - May 12—William Harvey Society. See page 765, issue of October 27.

February 16 - May 17—New England Physical Therapy Society. See schedule on page 1010, issue of December 1.

February 17 and 18—The New England Hospital Association. See notice on page 911, issue of November 17.

DISTRICT MEDICAL SOCIETIES

ESSEX NORTH DISTRICT MEDICAL SOCIETY

May 3—Wednesday, Annual Meeting. Program to be announced.

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

Tentative Program

Wednesday, February 1, 1933—Council Meeting, Boston.

Wednesday, March 8, 1933—Lynn Hospital. Clinic 5 P. M. Dinner 7 P. M. Speaker: Dr. Soma Weiss, Boston City Hospital. Subject: Arterial Hypertension.

Wednesday, April 5, 1933—Essex Sanatorium, Middleton. Clinic 5 P. M. Dinner 7 P. M. Speaker: Dr. Wilson G. Smillie, Professor of Public Health Administration, School of Public Health, Harvard University. Subject: Common Colds.

Thursday, May 4, 1933—Censors' Meeting, Salem Hospital. 3:30 P. M.

Tuesday, May 9, 1933—Annual Meeting. Salem Country Club, Forest Street, Peabody. Golf in afternoon; greens fee $2.00. Dinner at 7 P. M. Speaker: Dr. George Burgess Magrath. Subject to be announced later. Ladies invited.

R. E. STONE, M.D., Secretary.

FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings will be held at the Weldon in Greenfield on the second Tuesday of March and May.

CHARLES MOLINE, Secretary.

HAMPDEN DISTRICT MEDICAL SOCIETY

January 24—See page 174.

MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

The program of the Middlesex East District Medical Society for the coming year is as follows:

March 15 at Melrose.

May, at the Meadowbrook Club, Reading.

ALLAN R. CUNNINGHAM, Secretary.

NORFOLK DISTRICT MEDICAL SOCIETY

January 31, 1933—See page 174.

February 28, 1933—Time and place to be announced. "The Diagnosis and Treatment of Anemia," by Dr. William P. Murphy.

March 28, 1933—Time, place and subject to be announced. Speaker will be Dr. J. P. O'Hare.

May—Annual Meeting. Time, place and subject to be announced.

FRANK S. CRUICKSHANK, M.D., Secretary.
1695 Beacon Street, Brookline.

SUFFOLK DISTRICT MEDICAL SOCIETY

Wednesdays at 8:15 P. M.

January 25, 1933—General Meeting in association with the Boston Medical Library at the Boston Medical Library. See page 109, issue of January 12. (Boston Medical Library.)

March 29, 1933—Clinical Program, Massachusetts General Hospital.

April 26, 1933—Annual Meeting. Election of Officers. Scientific Program—Titles and speakers to be announced later.

The Medical Profession is cordially invited to attend all of these meetings.

WILLIAM H. ROBEY, M.D., President,
LELAND S. McKITTRICK, M.D., Secretary,
HILBERT F. DAY, M.D., Boston Medical Library.

WORCESTER DISTRICT MEDICAL SOCIETY

Wednesday, February 8—Dinner and scientific meeting at the Worcester State Hospital. Program to be announced later.

Wednesday, March 8—Dinner and scientific program at the Memorial Hospital, Worcester. Program to be announced later.

Wednesday, April 12—Dinner and scientific meeting at the Rutland State Hospital. Scientific program to be announced later.

Wednesday, May 10—The Annual Meeting. Place and program to be announced later.

ERWIN C. MILLER, Secretary.

BOOK REVIEWS

The Sputum. Its Examination and Clinical Significance. By RANDALL CLIFFORD, M.D. The Macmillan Company, New York. 1932. Price $4.00.

This book is a comprehensive survey of the examination and clinical significance of various features of the sputum. Because of the nature of the subject, there is very little controversial material. The author rightly stresses the value of postural drainage, not only for therapeutic purposes but also for diagnostic purposes or, more germane to his thesis, for the more complete examination of the sputum. We find omitted the possibility of hemorrhagic diseases causing hemoptysis, the spirochete of Castellani and its relation to "Putrid Bronchitis", and beyond mere mentioning of pneumococcus typing is pursued no farther.

For those whose interest lies chiefly in the domain of pulmonary diseases, this book will serve as a valuable review. What one might have to search for in many texts and periodicals has been extracted and correlated in this small volume.

The Diagnosis and Treatment of Diseases of the Thyroid Gland. By GEORGE CRILE and ASSOCIATES. Edited by Amy F. Rowland. Published by W. B. Saunders Company, Philadelphia. Price $6.50.

The preface of this book states that it is not a formal treatise on the thyroid gland, but rather an account of the experiences of the Cleveland Clinic in the treatment of diseases of that organ.

This book may not be a formal treatise on the thyroid gland, but it most certainly represents the results of a tremendous practical experience with the management of diseases associated with abnormal thyroid conditions. Practically every aspect of thyroid abnormalities is considered in this very valuable contribution of the books already available on thyroid diseases. Hypothyroidism, hyperthyroidism, the relation of iodine to the various thyroid conditions, the biochemistry of iodine, endemic goitre, the blood pressure in hyperthyroidism, variations in carbohydrate metabolism in hyperthyroidism, thyroiditis, Riedel's struma, and struma lymphomatosa are but a few of the various features considered in this extremely valuable book.

This book possesses the very essential requirements of a valuable contribution to medical literature; that is, it represents distinctly the results of actual personal experience with a large group of patients that have been carefully investigated, carefully treated, and carefully followed over a good many years. It represents the combined views of men on the thyroid subject, each of whom has been especially interested in special aspects of this subject. It possesses none of the features so common in many textbooks of compilations and opinions culled from the writings of other authors and carried down from one book to another, many of which are often antiquated and entirely incorrect.

One cannot fail to be impressed by the wealth of material in this book and with the fact that Dr. Crile and his associates have made the very best use of the large amount of material which has been at their disposal. Everyone who is interested in the subject of thyroid disease will enjoy reading this book and will obtain a large amount of knowledge from it.

Physical Therapeutic Technic. By FRANK BUTLER GRANGER, M.D. Second Edition. Revised by William D. McFee, M.D. 436 Pages. 135 Illustrations. W. B. Saunders Company, Philadelphia, Pa. 1932. Cloth, $6.50 net.

This second edition of the late Dr. Frank B. Granger's textbook on Physical Therapy maintains the same high standard as was characteristic of the first edition. Dr. McFee has brought the subject matter up-to-date. There are many minor alterations and some additions; but as stated in his preface it has been Dr. McFee's purpose to maintain as far as practicable Dr. Granger's original arrangement and text.

A chapter by Dr. G. B. Rice on Physical Therapy in ear, nose, and throat conditions has been added; also a brief note on Dr. Morton Smart's faradic unit.

Dr. Granger originally intended this book for the physician who had installed a limited equipment, and desired to use it intelligently. Both he and Dr. McFee fully recognized that physicians who bought equipment and attempted to operate it solely on the instructions of the manufacture's salesman might not only fail of securing results, but might actually do harm. A general practitioner might as logically expect to qualify as a surgeon solely by the purchase of a set of surgical instruments.

With this in mind, the first part of the book is devoted to the fundamentals of medical physics, followed by a general discussion of the various methods of application and technic. Chapters XVIII to XXV describe the application of Physical Therapy to certain special problems, among which might be mentioned low back conditions, arthritis, neuritis and neuralgia, hypertension, pulmonary diseases, various neurologic and orthopedic conditions, certain skin diseases, tonsils and hemorrhoids.

Chapter XXXVI (about 140 pp.) is an alphabetical arrangement for ready reference of the various conditions in which Physical Therapy is indicated. A brief summary of the advised technic is given in each instance. For more detailed discussion the reader is referred, when necessary, to the special chapters. There then follows a complete general index. Since this book is a record of the author's personal methods, no bibliography is provided.

Physical Therapy in its broadest sense covers the use of all physical agents in the treatment of disease;—heat, water, and mechanotherapy; electricity, and the various forms of spectral radiation. Since, however, x-ray and radium therapy constitute in themselves a separate specialty, they are properly omitted in a volume of this type.

Most of the book is devoted to that branch of Physical Therapy based on the use of the low and high tension electrical currents (faradic, galvanic, sinusoidal, diathermy, etc.), and to infra-red and ultraviolet radiation. There are short chapters on hydrotherapy, massage, and carbon dioxide snow.

Those forms of Physical Therapy sometimes referred to as Physio-Therapy; namely, corrective exercise, muscle training, occupational therapy, manipulation and massage; constitute in the reviewer's opinion a separate field more properly a subdivision of the orthopedic specialty. Except as above stated these subjects are mentioned in this book briefly if at all. It was Dr. Granger's opinion that the physician desiring to take up this phase of the work would do better to obtain the assistance of a man or woman well trained in these subjects, rather than to attempt to train his office assistant to do this type of work or to try to do it himself.

The wide experience of the author and the reviser in the use of Physical Therapy in government hospitals and in clinics gives this book a background hard to duplicate. The methods and technic advocated are based on practical experience and successful use. Many methods of doubtful or unproved value have wisely been omitted.

This book or its equivalent should be read by every physician regardless of whether he intends personally to use Physical Therapy or not. It will show him that Physical Therapy is something more than baking, exercise, and massage. It will give him an idea of what can and cannot be accomplished by the intelligent and scientific application of medical electricity and light therapy. It will help to counteract the extravagant claims of enthusiasts and special cults. It is to be hoped that it will deter the few physicians who still refer their patients to so-called "Physical Therapy Studios" for such highly technical treatments as diathermy and the various forms of spectral radiation: treatments which require a special training, and should never be administered except by a physician so trained or by qualified technicians working under immediate medical supervision.

Diseases of the Spinal Cord. By WILLIAMS B. CADWALADER, M.D. Baltimore: The Williams & Wilkins Company, 1932. xvii + 204 pages. Price $5.00.

This book is a very careful, although brief, presentation of the structural diseases of the spinal cord, with an introduction on the neuron theory, the anatomy and physiology of the cord, and an excellent twenty-page bibliography of all the important papers dealing with both the physiology and diseases. There are first-class illustrations both of the clinical studies and the pathology. Although the book is only two hundred pages in length, it is carefully written, each sentence packed with meaning, without any redundant material or padding. From the technical point of view of printing, illustrations, binding, and general appearance, the reviewer is more impressed by this book than any that has recently come to hand. The price at first seems to be a little excessive, but the work is of such worth that for five dollars no physician or medical student will get more for his money in specialized literature. Would that we had a whole textbook of neurology as finely written!